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# The Emergence of the Megacity and its Impact on Natural Food Resources: The Case of Fish Distribution in Jakarta

## **Abstract**

*This study investigates the impact of the drastic retail transformation in newly-emerging megacities on global food resources. Global growth of population and economies in the twenty-first century has spurred on the dramatically rapid formation of megacities, with massive concentrations of population that affect not only the urban space but also entire systems of the production and distribution of food. The purpose of this study is to clarify the causal relationships between urban development, the structural change of distribution, and the production and consumption of natural resources.*

## **Key Words**

Megacity, Sustainability, Emerging Market, Market System, Fish Distribution, Jakarta, Indonesia

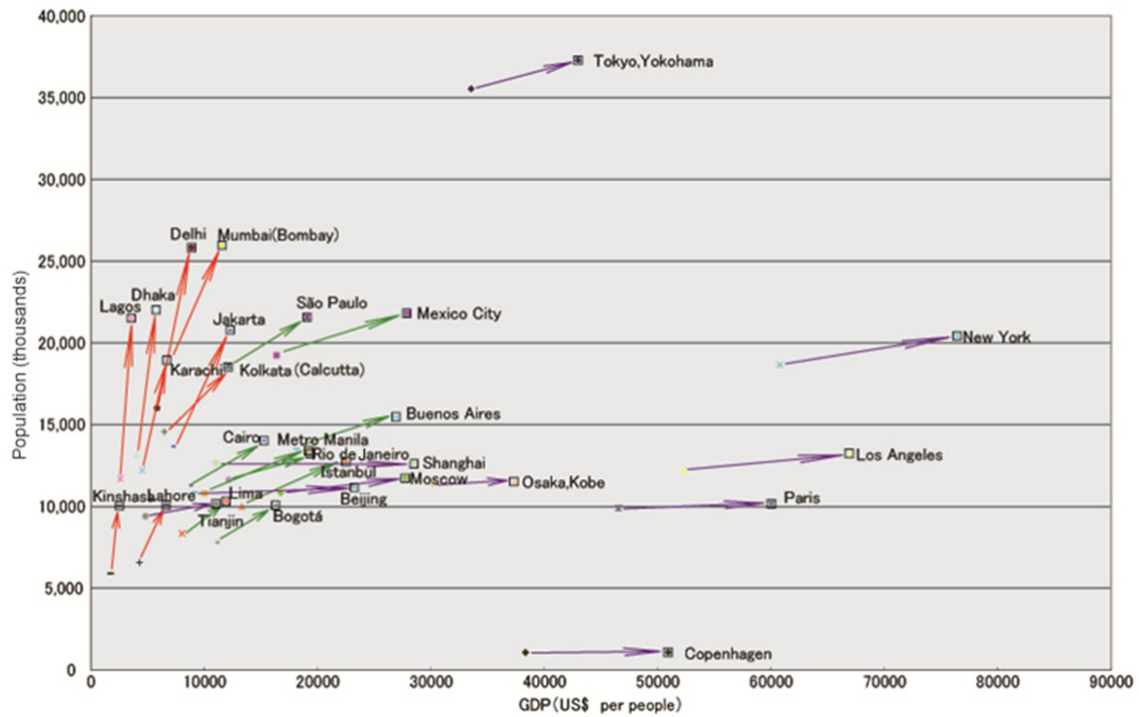
## **Introduction and Objectives**

The ultimate goal underlying this research is to arrive at some solutions to the question of the kinds of methods that could be employed to achieve both ecologically and economically sustainable food distribution systems in megacities. Special attention is given to seafood resources, as fisheries directly benefit from wild nature, and are less industrialized in comparison to other food resources such as cereals, dairy, poultry, or meat. As fish stocks have remained dependent on nature, technological innovation could bring destructive impacts to this natural resource. The issue is growing far more complicated, as former export countries evolve into import countries, with the penetration of new technologies, such as sophisticated freezing, or logistics. In the course of development, local fisheries could decline, while fish consumption expands.

Jakarta is examined, with special focus on fish resources. Jakarta is one of the most

rapidly growing megacities (Figure 1) today in terms of economic development, and, unlike Chinese cities in which meat consumption is more emphasized than fish, Indonesian food culture has traditionally depended more on fish resources, with its thousands of islands surrounded by an ocean supplying a very rich bounty of seafood to the Indonesian population. It is an ideal case for examining the impact of the emergence of megacities on natural fish resources.

**Figure 1. Emerging Megacities in the Twenty-first Century:  
Estimates of Population and Economic Growth**



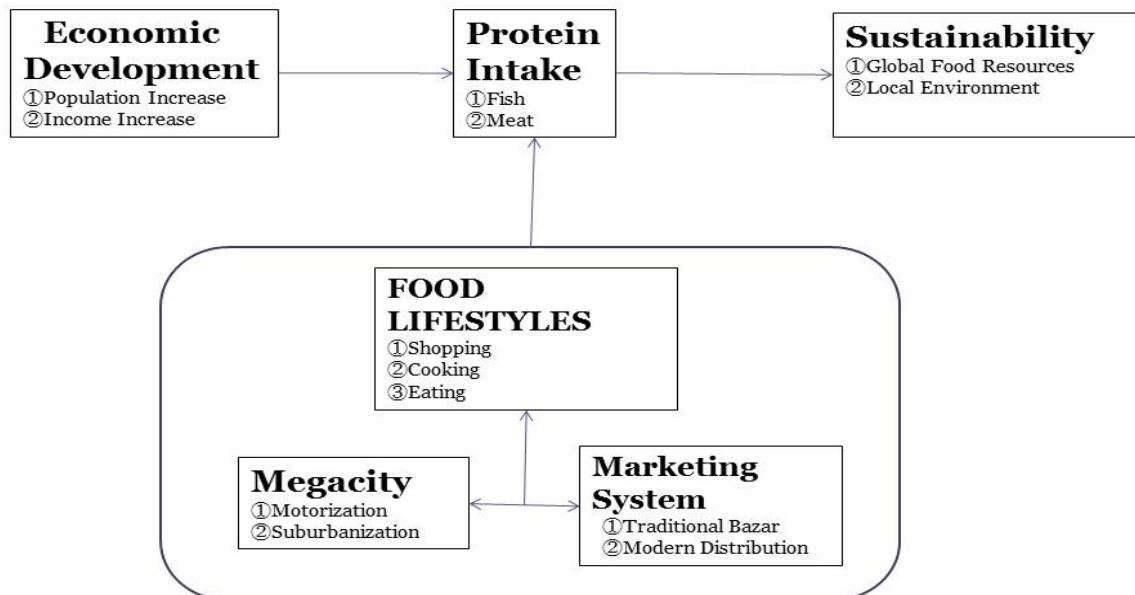
(Muramatsu Laboratory, Institute of Industrial Science, University of Tokyo)

## Conceptual Framework

Figure 2 presents the conceptual framework of this study. The study focuses on the linkage between megacities and marketing systems as the essential factor which affects the food consumptions. The population growth and income increase are the factors generally thought to be threatening the environmental sustainability. We pay a special attention on the protein intake as it is strongly correlated with the income increase and also the ecological footprint increase.

We postulate that the way the cities mediate marketing systems have very strong impacts on food lifestyles of the inhabitants. Since the megacities are considered to be the major place where drastic population growth are taking place in the early 21st century, how the marketing systems are molded into them would be crucially important. How the marketing systems drastically changing in Jakarta affect the food lifestyles? What would be the environmental consequences of the food lifestyles' change? While they are the key central questions for this research project, only the former would be discussed for this short study.

**Figure 2. Conceptual Framework**



## **Literature Review #1: Cities, Markets, and Marketing Systems**

Macromarketing has a tradition to grasp a market not just as a theoretical apparatus which combines supply and demand but a substantial entity consisting of the large number of players who participate in the great chain of exchanges (Fisk 1967; Alderson 1957, 1965). It shares interest with economic sociology in that it sees the economic exchange system as a subsystem of the social system (Fisk 1974; Smelser and Swedberg 2005). Economic sociology, however, has short tradition of market study when compared to economic theory (Swedberg 2005). Sociology's silence about markets is ironical, when we think about the history of sociology which had emerged with the birth of market economy in the late nineteenth century. The great transformations took place in such a way that the traditional economy was replaced by the entirely new economy where markets, and markets alone, control, regulate, and direct an economic system (Polanyi 1944).

Swedberg suggested that economic sociology should take concrete markets as the point of departure to develop a theory of markets, and introduced a historical frame of analysis to understand markets as evolving exchange mechanisms embedded in the human societies (Swedberg 2005). Macromarketing scholars contrived the term agorology by sharing the same basic interests in markets. “The agora was much more than just a commercial center, just as the study of exchange relationships” (Mittelstaedt, Kilbourne, Mittelstaedt, 2006). Swedberg categorized external markets, internal markets, markets for merchants, then national markets, modern mass markets, international markets, and finally labor markets.

Markets took concrete shape when cities were formed. While the ancient tribes exchanged products between groups not within groups (external markets), the exchanges were enclosed with cities in the rise of city-states (internal markets). From the very early stage, cities were not at all the stand-alone fortresses. They not only depended on the supply from the farmlands outside but also on the other cities. Cities were connected each other, and various ways of governing the merchant networks developed (markets for merchants). Cities became grandiose when the mercantilist rulers of the modern age tried to integrate the fragmented markets by abolishing local customs (National markets).

With the Industrial Revolution, the role of cities linked to markets had changed crucially. As Swerberg put it; “Before the Industrial Revolution, markets were typically defined in terms of a specific place; a market took place in a clearly delineated area-say in a special square city of on a designated piece of land belonging to a lord. Now, however, markets spread out geographically, a change reflected in the definitions of markets that we find in the nineteenth century”. As he refers to Cournot, “the market is not a certain place where purchases and sales are carried on, but the entire territory of which the parts are so united by the relations of unrestricted commerce that prices there take the same throughout, with ease and rapidity.” (Swedberg 2005, p.238) In order to extend the scale of the production, the modern mass marketing technique had been evolved (Modern mass markets).

The obvious function of market as a center of a city had been taken place by the more complicated, modern function of marketing systems which govern cities in a very different way. As defined by Dowling, a marketing system emerged as “a complex social mechanism for coordination production, distribution and consumption decisions” (Dowling 1983, p. 22). As Layton pointed out, the classification by the economic sociologist, such as Polanyi and Swedberg, deal primarily with markets not marketing systems” (Layton 2007). Also their explanation till Industrial Revolution is smooth, as noted above, but it sounds evasive when it comes to the modern age. The notion of a marketing system becomes especially relevant when we explore the markets after the great transformation.

## **Literature Review #2: Sustainability**

One of the most pioneering and influential work about sustainability would be that of Malthus's. Malthus postulated that the population growth was exponential while agricultural growth was arithmetic, therefore the rapidly growing population was to be suppressed ‘misery and vice’.

Malthus was right at least until the 18<sup>th</sup> century. Famine was common in Europe. Due to the agricultural revolution which contributed to the improved productivity of land and labor

population increased in England. Income was stagnant, however, as the technological evolution and productivity increase was offset by the further population increase, not resulting in the improvement of the standard of living. Harvest failures due to the climate changes or crop diseases could critically threaten human lives. The French Revolution in 1789, for example, resulted from the poor harvest and a steep rise in the price of bread.

The trap Malthus walked into was that his book was just launched exactly when the British economy was escaping the Malthus' trap. In the 19<sup>th</sup> century, unprecedented population increase, supported by the economic growth, was observed. The world population was doubled from about one billion at the time of the French revolution to the middle of the nineteenth century. After the Corn Law was repealed in 1846 after heated arguments, food flew into the country and nourished the poor who were expelled from the farmlands. The Industrial Revolution was complimented by the rich food supply, as a result of agricultural revolutions such as advanced engineering and chemical fertilizer and the management of the large scale plantations in the colonies.

By the end of the 19<sup>th</sup> century, however, the fertilizer sources, deposits of guano and potassium nitrate, were massively used and had been fully exploited. Then, technology for manufacturing of ammonia was developed in the field of explosive industry at the time of the First World War. When the supply of nitrogenous fertilizer became inexhaustible, innovations in plant breeding and genetics followed (Trewavas 2002). The massive population explosion the twenty century world faced after the Second World War was averted by Green Revolution in the 50's. Exactly when the Green Revolution was feeding exploding population, "The Limits to Growth" by Club of Rome was published. As Trewavas put, "Malthus foiled again and again." Or, Malthus returns again and again?

Two alternative views for sustainability could be distinguished. One is the Malthusian view. "The increase of population is necessarily limited by the means of subsistence," as Malthus put. He stated that population would invariably increase when the means of subsistence increase, but would be repressed as the growth rate of the population is higher than the increase of the land productivity. How misery and vice the process could be, the population is automatically

controlled.

Opposite to Malthusian, the progressivists focus on the technological innovation which overcomes the limit of the resources. Being a cornucopian, who believes that resources given to mankind are limitless, progressivists think that an innovative progress should always be expected when mankind faces a crisis. Sustainability is not determined by resources, but is the outcome of continuous efforts of mankind to make progress.

Malthus's logic based on the diminishing returns was the theoretical apparatus of the classical economics that included self-regulation mechanism in the model. On the other hand, progressivists do not set the theoretical restriction on the growth. What limits the growth? Malthus extended his diminishing returns framework to the economic growth theory in his later work (Malthus, 1820), in which he pointed the similarity between the population-food relationship and the economic (capital) growth –effective demand relationship. Just as the food limits the population growth, the effective demand limits the economic growth.

Just like people need foods, the capital needs demands. This is where marketing came in, as the technology to cultivate and fertilize consumer demand. In the post-Malthusian world, where the people in the growing economy are well fed, the economy is to continuously create demand. The marketing concept has developed into the Dominant Social Paradigm, has so embedded in the belief system of the hyper-consumption (Kilbourne, McDonagh, and Prothero 1997). Marketing systems form drastic crossroads of the two mechanisms; food and demand. They have so drastically changed the way people eat and foods produced. We need food to feed people. Also, we need to make people to need more food in order to make people produce more food.

### **Literature Review #3: Megacities and Food System**

Megacities are where the 21<sup>st</sup> century version of Malthus's return is observed. Success of Green Revolution not only nourished increasing population, but also has urged people to pursue wealth by massively moving to the cities. The migration has made cities into huge megacities,



which are transforming food system entirely. The way people consume food is very much influenced by the lifestyles shaped by the cities. Food consumption grows so fast both in terms of quantity and quality. While the path was experienced by the developed countries, emerging megacities are struggling in the different sphere.

Emerging countries are doubly burdened. Unlike Western large cities emerged in the 19<sup>th</sup> century, the 21<sup>st</sup> megacities cannot depend on the outside colonies. Farmlands have to feed growing number of new urban populations in addition to the gorging population in the richer cities in the developed countries. Although emerging countries have been trying to be self-sufficient, dependence on import foods is becoming a reality because of the increasing population and their appetite. In order to import food, they have to achieve rapid economic growth by industrialization.

As a consequence, megacities experience multifaceted environmental challenges, as they have both industrial and natural development at the same time. The land and water contamination has got very serious because of industrial, agricultural and domestic wastewater and chemical products. The megacities have their own north-south divides in same cities in terms of the ecological footprints, as the richer inhabitants consume more meat and aqua-cultured fish fed by local fish which they used to eat. The cities are vulnerable to epidemics because the people and animals live so close in the urban spaces to satisfy the growing protein consumptions. As everything is so packed in the urban space, external diseconomies seem to be so large. How could the megacities be sustainable places? We assume the marketing system plays a key role to walk a 21<sup>st</sup> century Malthusian tight rope.

## **Method**

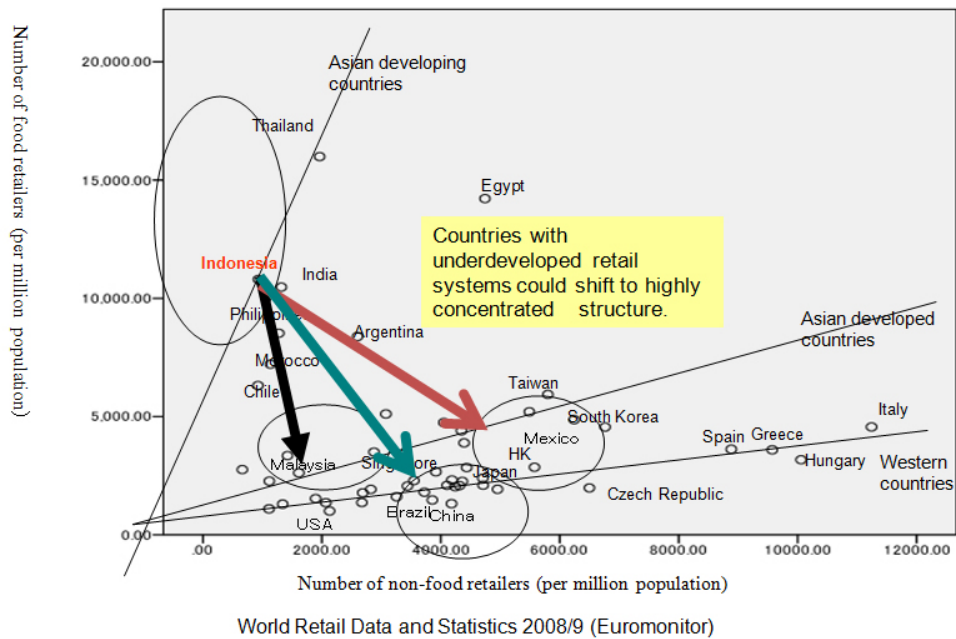
To examine the causal relationships outlined above, data in the following categories is collected: (1) international comparison of retail structure; (2) urban development and the penetration of modern retailing; (3) statistics on food consumption: urban vs. rural, by expenditure class; and (4) interviews with retailers/marketplace about the food resource supply chain.

## Findings

### *(1) International Comparison of Retail Structure*

Figure 3 presents an international comparison of retail concentration in food and non-food categories. Retail concentration is measured by per capita number of retailers. We might postulate two major patterns in the chart. First, the more developed the country, the more retail concentration. Cultural/social characteristics would modify this tendency, but it might hold true at a macroscopic level. Second, the ratio of non-food to food retailers increases according to economic growth. If we categorize countries into three major groups—Western countries, developed Asian countries, and developing Asian countries—we observe the peculiar tendency that the newly-developed and developing countries tend to introduce modern westernized distribution systems. As we observe in Malaysia, Singapore, and China, the speed of penetration is very high. We assume that newly-developing countries like India, the Philippines, and Indonesia may follow this path.

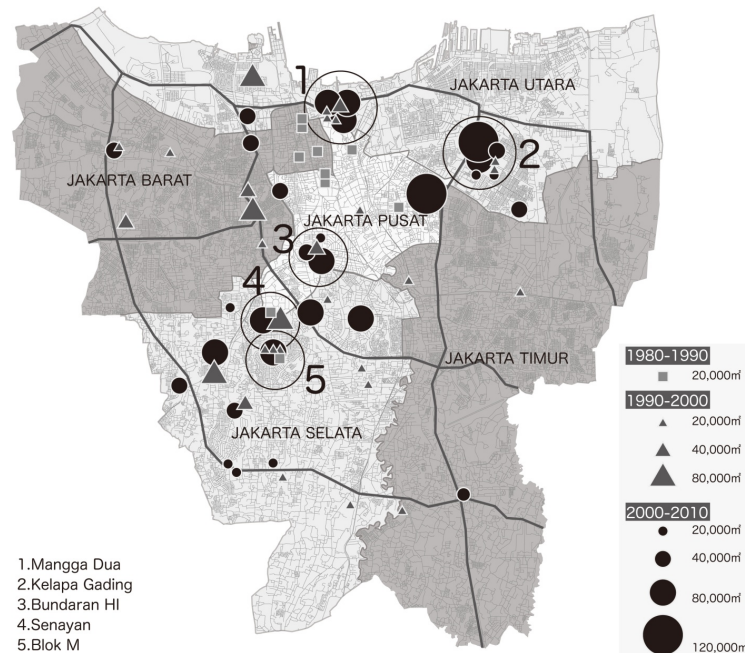
**Figure 3. Retail Structure in World Perspective**



## ***(2) Urban Development and the Penetration of Modern Retailing***

One of the major reasons for the rapid penetration of modern food retailing (e.g., hypermarkets and supermarkets) is the dramatic expansion of the megacities. Figure 4 shows the development of modern shopping center areas in Jakarta by era. New residential developments accompany the modern shopping centers. As the city extends in size, the market share of modern distribution would drastically increase.

**Figure 4. Development of Modern Shopping Center Areas in Jakarta**



## ***(3) Statistics on Food Consumption: Urban vs. Rural, by Expenditure Class***

The urbanization of megacities accompanies a drastic change in terms of food consumption in the following ways:

- Daily Average Consumption of Total Calories - In both cities and rural areas, total calorie consumption is gradually increasing; calorie consumption is relatively low in cities (Appendix A, B, and D).

- B. Daily Average Consumption of Calories by Food Group - Cereal calorie consumption is decreasing, with the tendency for cereal calories to be replaced by calories from prepared food and beverages more significant in the cities (Appendix C, and E). The tendency is even more pronounced in Jakarta.
- C. Average per Capita Weekly Animal Product Consumption by Food Item and Expenditure Class - Here, the contrast between urban and rural is sharp, while the tendency toward more animal product consumption according to income is common. In the cities, more broilers than fish are consumed as income rises. In rural areas, fish consumption remains high, especially in the “other fish” category (Appendix F and G).

#### ***(4) Site Visits/Interviews with Distributors about the Food Resource Supply Chain***

Findings from preliminary interviews with managers in charge of procurement at different types of food retailers are as follows. First, the fish procurement function at the large-scale hypermarket chain is very concentrated. A limited number of middlemen purchase fish as agents. The product variety (excluding frozen fish) in local markets (pasar) and hypermarkets is similar. Second, a growing number of frozen fish are sold at hypermarkets. The procurement channel for frozen fish is very different from traditional channels for locally-caught fish, and is often global. Third, a significant increase in aquacultured fish, such as tilapia and milkfish, can be observed. Fourth, broiler meat and aquacultured fish could either be substitutes or complementary goods, depending on market conditions. For the low-income segment, chicken meat is considered to be too expensive. Those consumers look for discounted fish at the local market. For the middle-income segment, in turn, fish sold at the hypermarket could be too expensive. They are consuming more chicken instead. High-income segment consumers eat both, and their protein consumption level has increased so far.

#### **Discussion**

In Indonesia, the impact of modern distribution on worldwide seafood resources seems to be still limited. However, very affluent consumers are enjoying sushi-grade fresh fish. When income levels increase, the megacity might become more dependent on global resources. The

significant impact of modern distribution is observed in the increase of aquacultured and frozen fish.

### **Limitations/Further Research**

The impacts of retail modernization on the environment must be further examined. Most of the frozen fish is originally farmed, and is imported from countries such as Vietnam and Thailand, where exporters are globally competitive. We might also investigate the influence of aquaculture on the environment, in areas such as land and water pollution, and destruction of local ecosystems. Also, the use of fish as fertilizers for meat production as well as aquaculture should be further reviewed.

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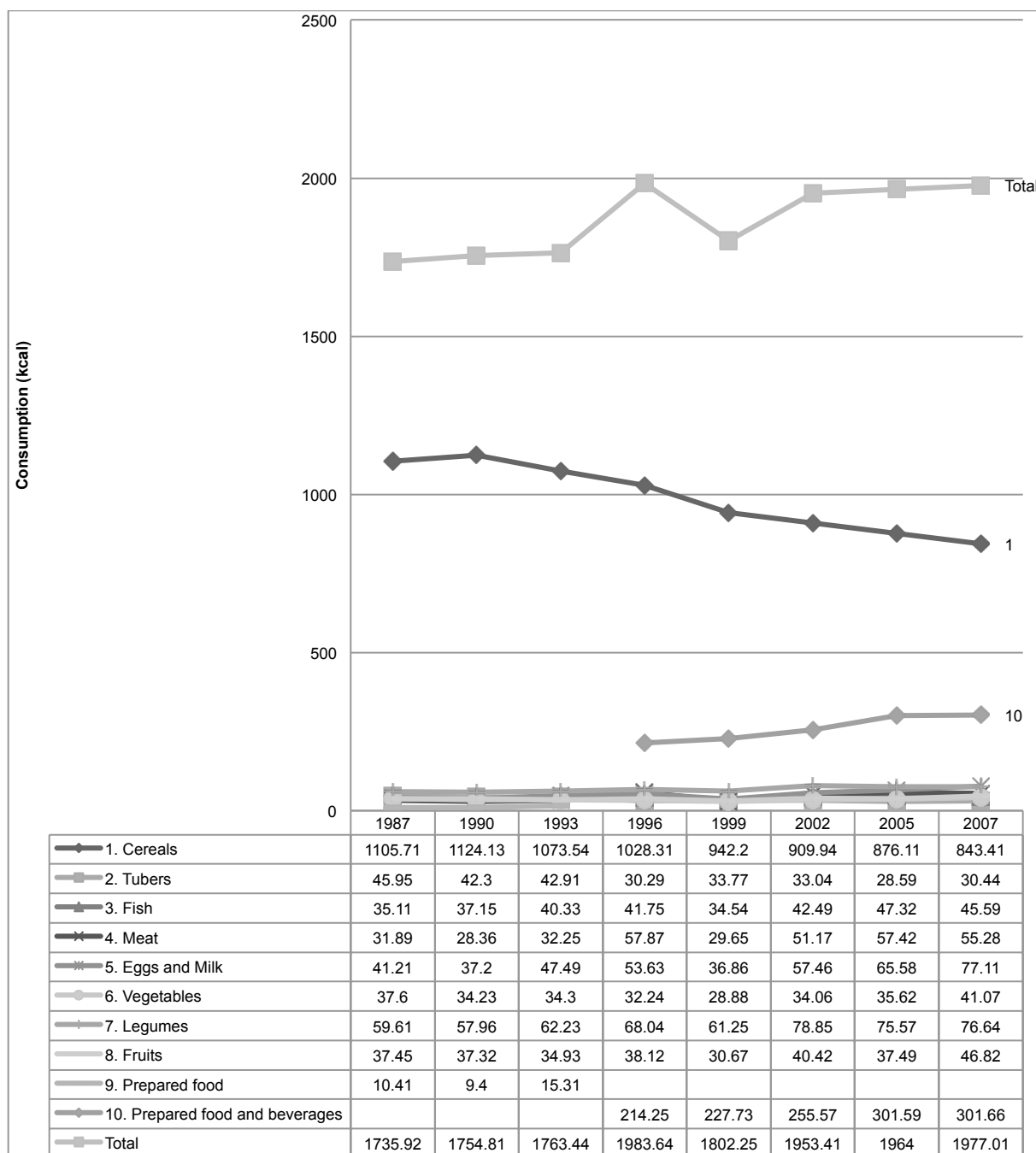
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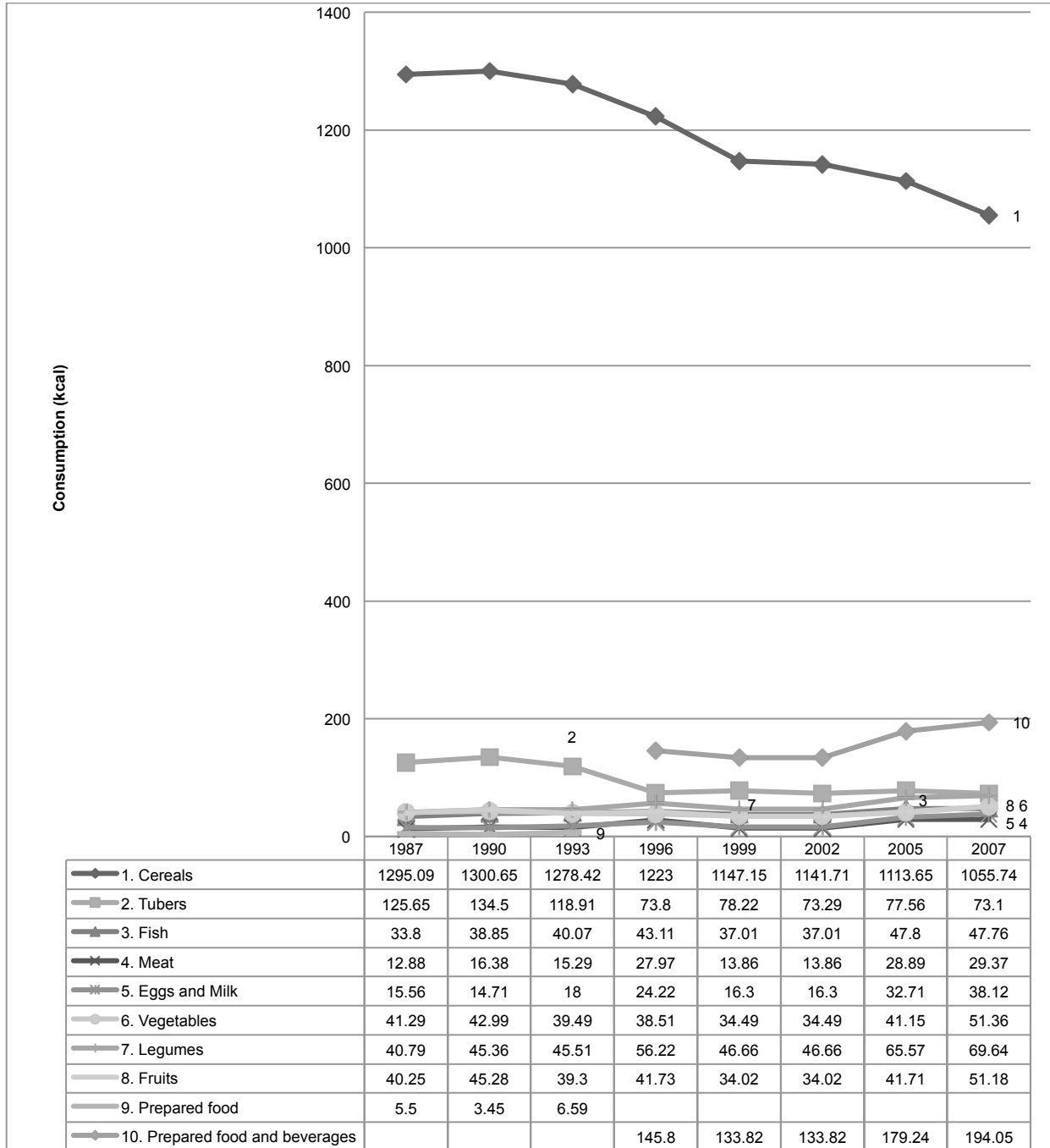
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## Appendix A. Daily Average Consumption of Calories per Capita by Food Group 1987–2007 (Urban)



(Consumption of Calories and Protein of Indonesia: 1993, 1996, 1999, 2002, 2005, 2007. Badan Pusat Statistik, Jakarta-Indonesia)

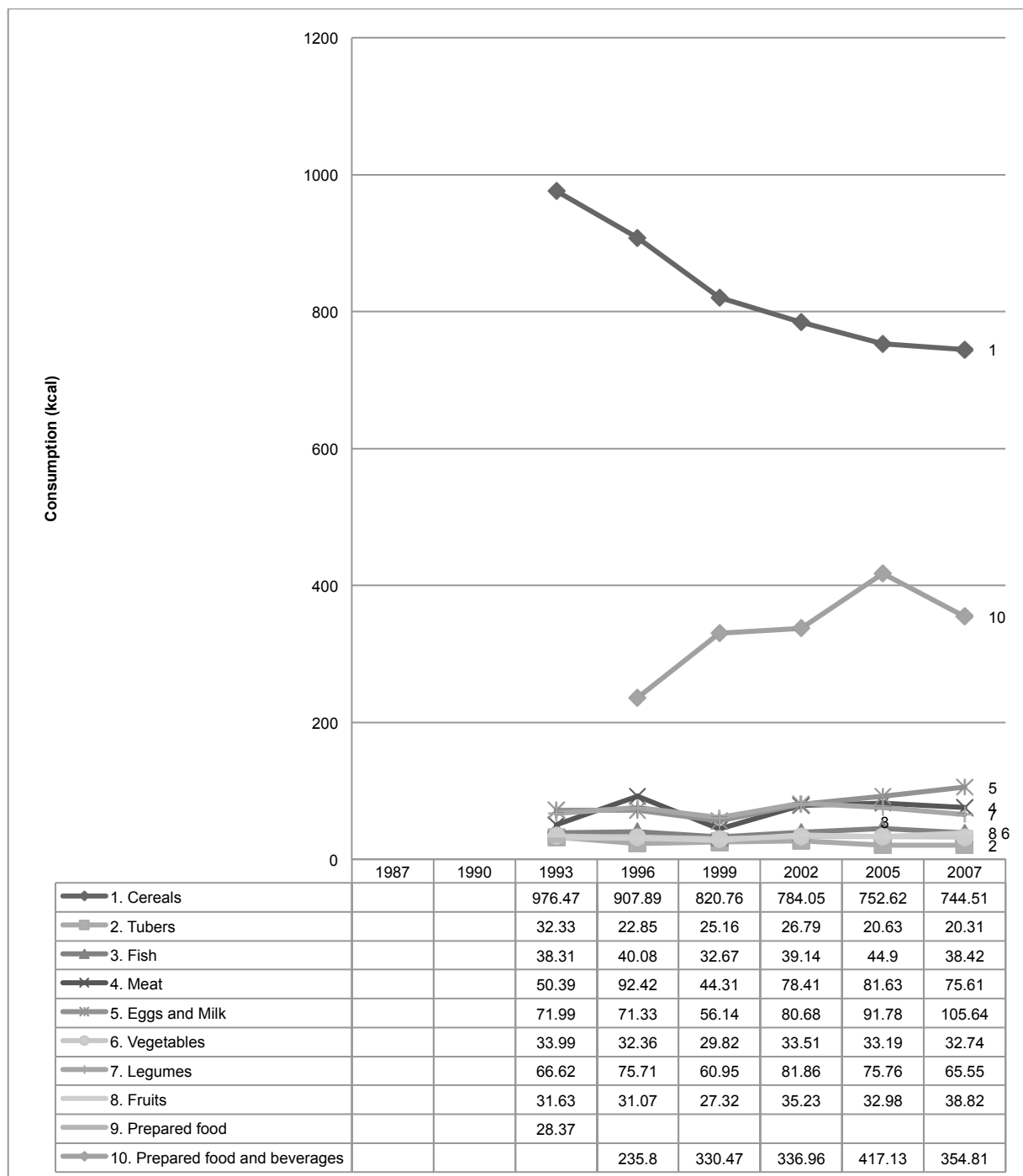
**Appendix B. Daily Average Consumption of Calories per Capita by Food Group  
1987–2007 (Rural)**



(Consumption of Calories and Protein of Indonesia: 1993, 1996, 1999, 2002, 2005, 2007. Badan Pusat Statistik, Jakarta-Indonesia)

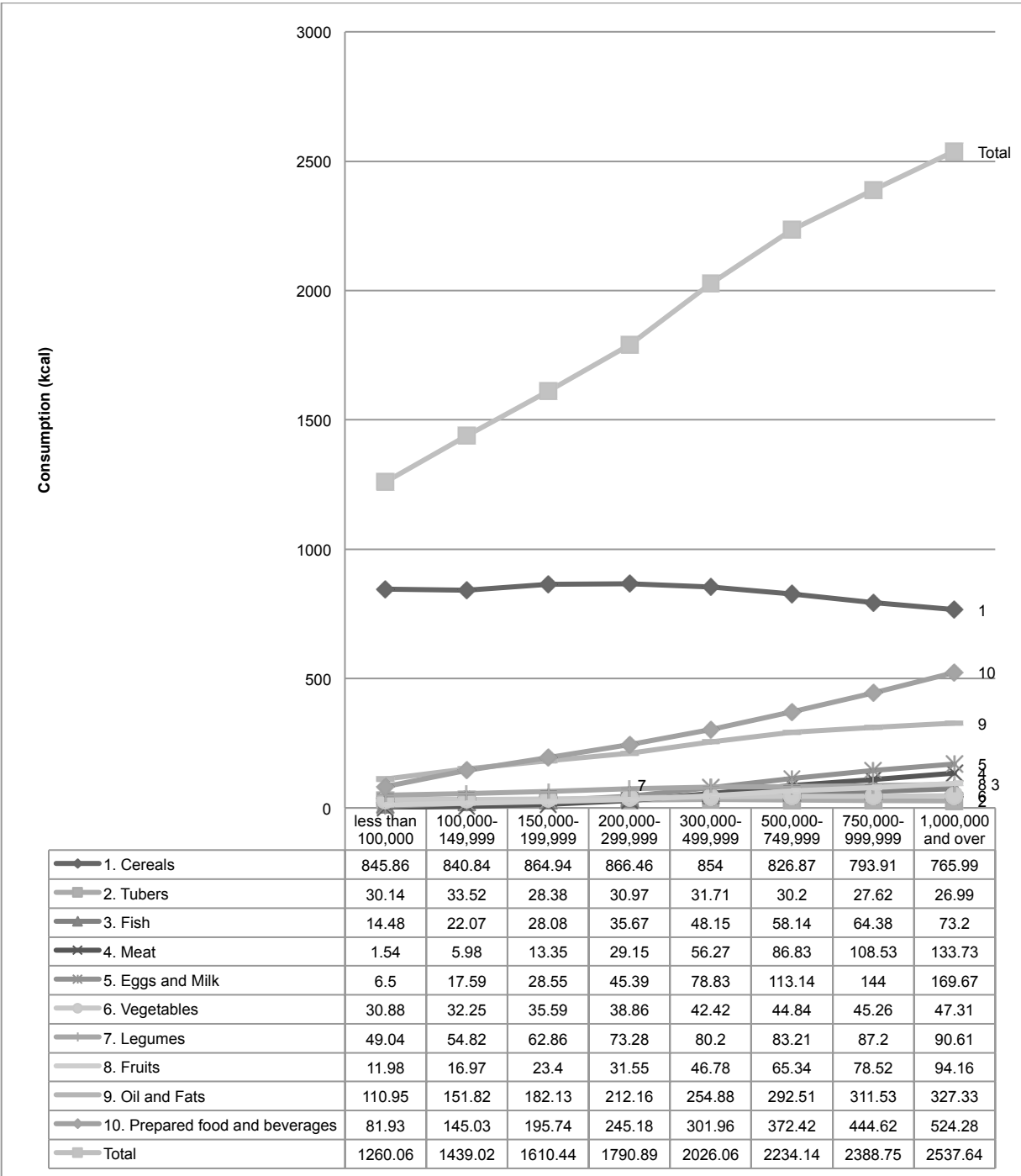


### Appendix C. Daily Average Consumption of Calories per Capita by Food Group 1987–2007 (Jakarta)



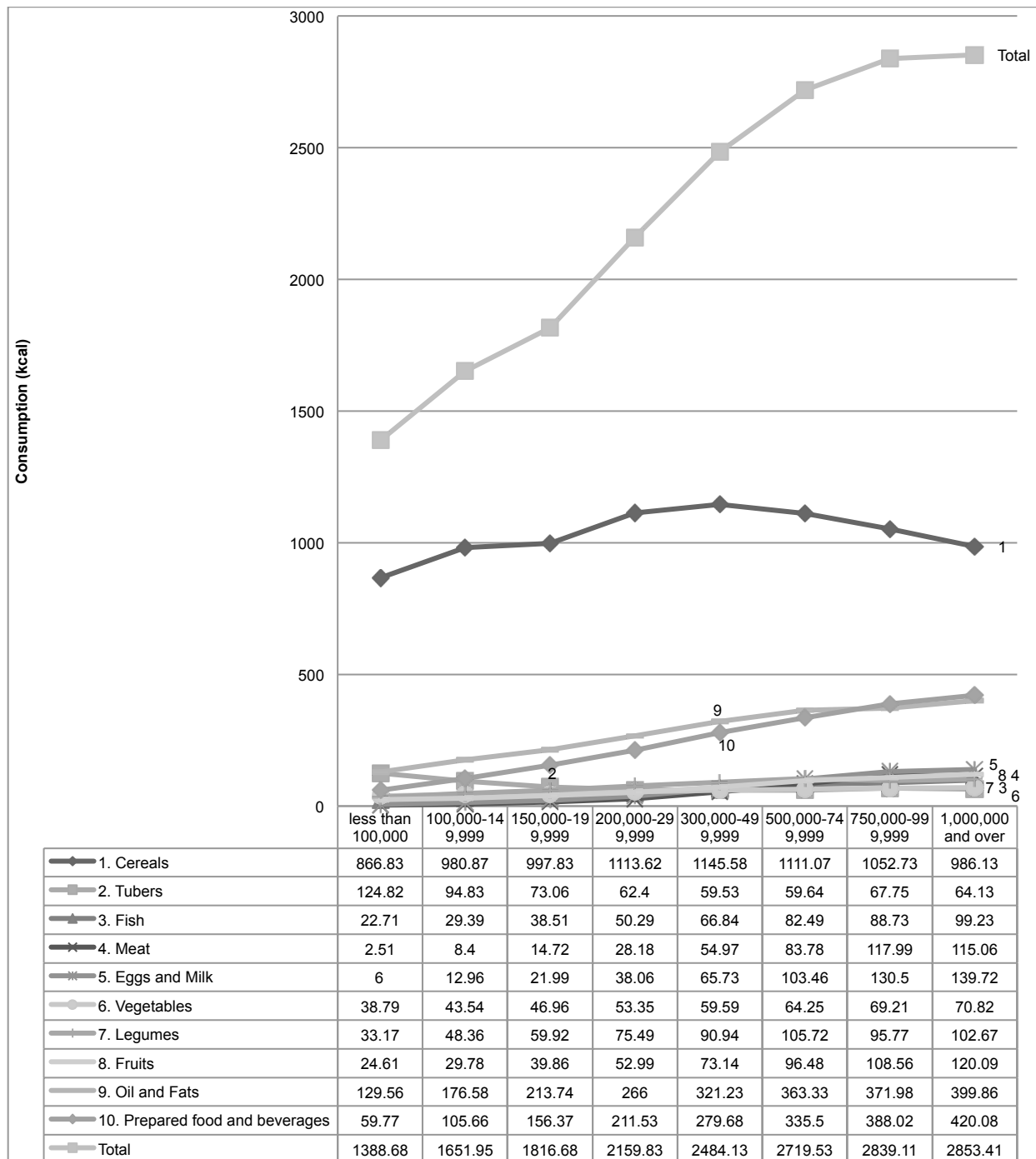
(Consumption of Calorie and Protein of Indonesia: 1993, 1996, 1999, 2002, 2005, 2007. Badan Pusat Statistik, Jakarta-Indonesia)

**Appendix D. Average Daily per Capita Consumption of Calories by Food Group and Monthly per Capita Expenditure Class, 2007 (Urban)**



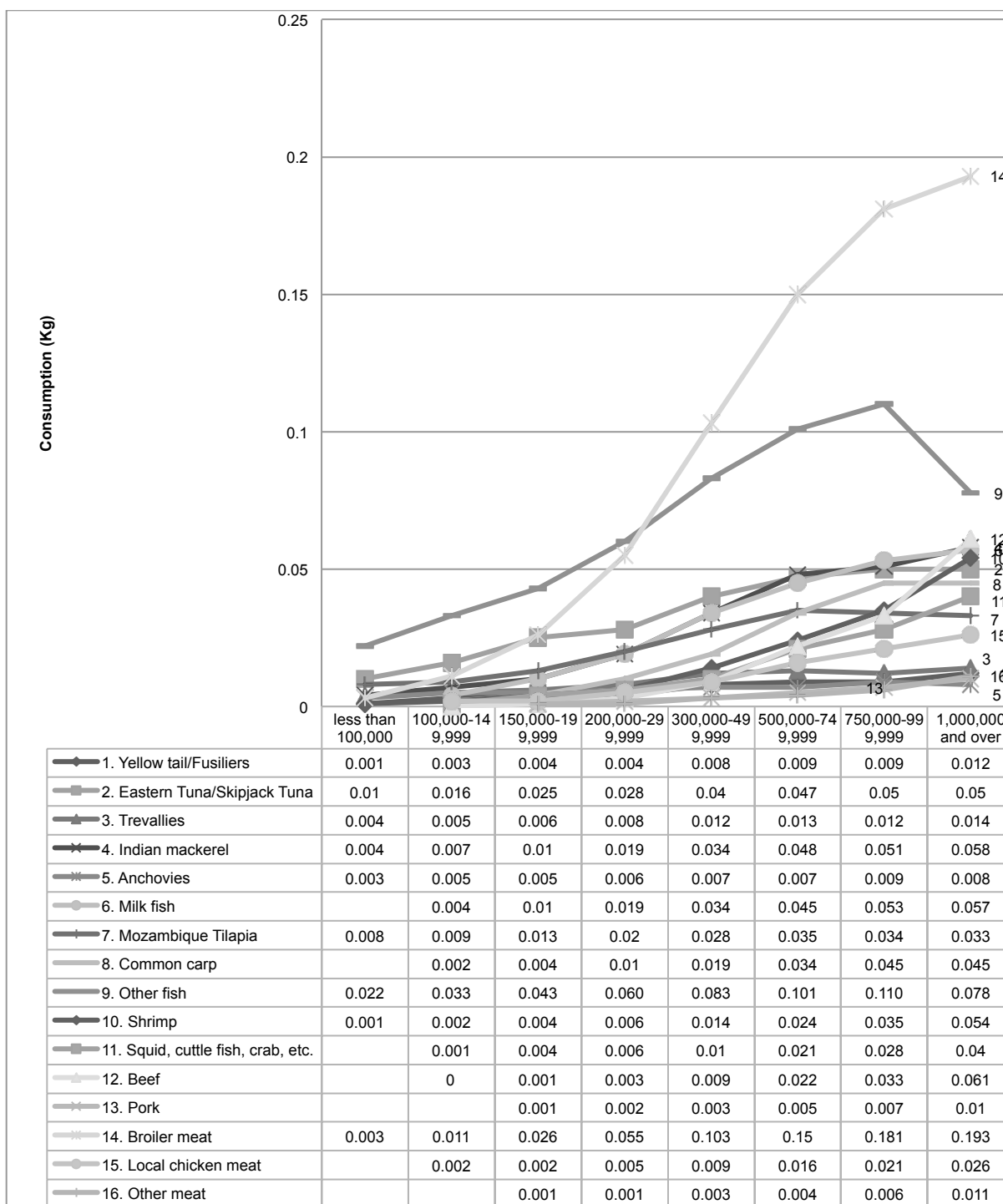
(Consumption of Calorie and Protein of Indonesia: 2007. Badan Pusat Statistik, Jakarta-Indonesia)

**Appendix E. Average Daily per Capita Consumption of Calories by Food Group and Monthly per Capita Expenditure Class, 2007 (Rural)**



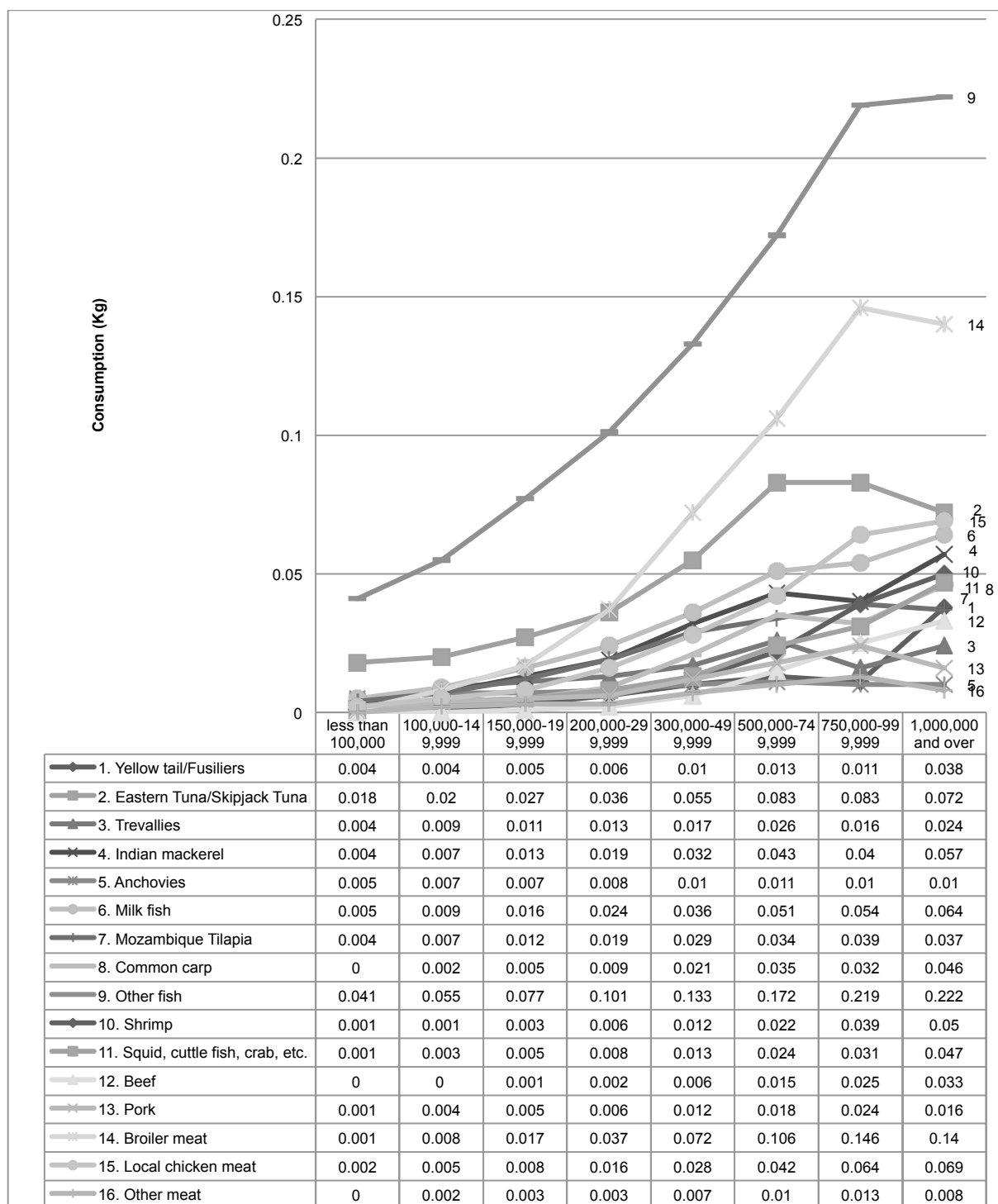
(Consumption of Calorie and Protein of Indonesia: 2007. Badan Pusat Statistik, Jakarta-Indonesia)

## Appendix F. Average per Capita Weekly Consumption by Food Item and Monthly per Capita Expenditure Class, 2007 (Urban)



(Expenditure for Consumption of Indonesia 2007. Badan Pusat Statistik, Jakarta-Indonesia)

## Appendix G. Average per Capita Weekly Consumption by Food Item and Monthly per Capita Expenditure Class, 2007 (Rural)



(Expenditure for Consumption of Indonesia 2007. Badan Pusat Statistik, Jakarta-Indonesia)