

# Protein Consumption in Thailand

## *An Analysis of National Trends in Protein Intake and Implications for Health and Sustainability*

## 1. Introduction

Thailand's food system is undergoing a rapid transformation. Driven by urbanisation, rising incomes, other demographic shifts, and greater integration into global markets, dietary patterns in Thailand have moved steadily away from traditional plant-based meals toward increasingly animal-rich dietary patterns. These shifts mirror broader global trends seen in many middle-income countries, where the nutrition transition is marked by higher consumption of meat, dairy, and processed foods, often accompanied by a decline in fibre, legumes, fruit, and vegetable consumption (Popkin et al., 2020; IFPRI, 2021). While such changes may be interpreted as signs of improved food security, they also raise important concerns about long-term health outcomes, environmental sustainability, and nutritional adequacy.

To better understand these dynamics, a team of researchers at the Institute of Nutrition, Mahidol University, conducted a comprehensive analysis of protein consumption in Thailand. The study brings together insights from two nationally representative datasets:

- the 2nd Thailand National Food Consumption Survey (FCS), based on single-day 24-hour dietary recall interviews conducted between 2013 and 2015, and
- the Thailand Household Socio-Economic Survey (HSES), which provides household-level food expenditure data for the years 2011, 2015, and 2019.

Together, these data sources allow for a detailed and multi-layered examination of protein consumption trends, dietary composition, and socio-demographic patterns.

1 Popkin BA, Ng SW. The nutrition transition to a stage of high obesity and noncommunicable disease prevalence dominated by ultra-processed foods is not inevitable. *Obes Rev* [Internet]. 2022 Jan;23(1):e13566. Available from: <http://dx.doi.org/10.1111/obes.13566>; IFPRI, 2021. [Transforming Food Systems After COVID-19](#)

This paper presents an analysis of protein consumption trends in Thailand from 2011 to 2019 using both FCS and HSES data. It focuses on five critical findings:

1. Thailand is protein secure, with intake levels exceeding physiological needs for some population groups.
2. Animal sources dominate the protein supply, with limited contribution from plant-based sources.
3. Protein intake has increased over time.
4. This increase coincides with reduced intake of other essential food groups, such as fruits and vegetables.
5. Even when benchmarked against the EAT-Lancet diet—which assumes higher caloric needs—Thailand’s average diet is disproportionately animal protein-heavy and plant-poor.

Together, these findings offer insight into the shifting nutritional landscape in Thailand and point to opportunities for aligning national diets with health and sustainability imperatives.

## 2. Methodology

This study draws on two nationally representative datasets to examine protein consumption trends in Thailand: (1) the 2nd Thailand National Food Consumption Survey (FCS), based on individual 24-hour dietary recall interviews; and (2) the Thailand Household Socio-Economic Survey (HSES), which captures household-level food acquisition and expenditure data. Together, these complementary sources provide both cross-sectional and longitudinal insights into food consumption patterns, dietary composition, and socio-demographic variation.

### 2.1 Food Consumption Survey (FCS)

The 2nd Thailand National Food Consumption Survey (FCS) was conducted by the Institute of Nutrition, Mahidol University between 2013 and 2015, with support from the National Bureau of Agricultural Commodity and Food Standards. A nationally representative sample of 8,478 individuals was randomly selected from 17 provinces across all four regions of Thailand—including Bangkok—using a multi-stage stratified sampling design. The sample includes participants across all life stages, from infancy to old age. For the purposes of this analysis, we focus on the subsample of 4,748 individuals aged 13 years and above, allowing comparability with adult nutrition benchmarks and global

dietary guidelines. However, seven participants were excluded due to specific criteria: five reported following vegetarian diets, one recorded an implausibly high energy intake (>11,000 kcal/day), and one was missing weight information. Consequently, the final analytic sample comprises 4,741 participants.

The survey employed a single-day 24-hour dietary recall method, administered in-person by trained enumerators using a standardised multi-pass interview protocol and visual aids.

The dietary information was coded and analysed using INMUCAL, a nutrient calculation programme developed by the Institute of Nutrition, Mahidol University. Nutrient intake data—including energy, protein (total, animal, plant), and macronutrient ratios—were generated and subsequently weighted to be nationally representative by age, sex, area of residence (urban/rural), and region.

### **2.2 Household Socio-Economic Survey (HSES)**

The Thailand Household Socio-Economic Survey, conducted by the National Statistical Office, captures household-level food acquisition and expenditure. For this study, we use data from three rounds: 2011 (n=42,084 households), 2015 (n=43,400), and 2019 (n=45,586). The dataset includes detailed information on the quantity and value of 251 food items, including foods purchased, received, and produced for household consumption.

Weekly household food expenditure was converted to daily per capita consumption using FAO food density data and standard portion sizes from the FCS. Protein intake was then calculated using Thai food composition tables and distributed across household members based on each individual's relative caloric needs (adjusted for age and sex). This approach enabled estimation of protein intake at the individual level, despite the household-level nature of the original data.

### **2.3 Comparability and complementarity of data sources**

While methodologically distinct, the FCS and HSES datasets are complementary. The FCS provides high-resolution, individual-level data suitable for nutrient-level benchmarking, while the HSES enables longitudinal tracking of consumption patterns over time and across demographic strata.

Although limitations in precision and recall exist in both sources, they show converging evidence: high and rising levels of total protein intake, disproportionate reliance on animal sources, and declining consumption of nutrient-dense plant-based foods such as legumes, fruits, and vegetables. Together, they offer a robust empirical basis for assessing Thailand's dietary transition and its alignment with national and global health and sustainability targets.

### 3. Preliminary messages

#### 3.1 Thailand is protein secure, with intake levels exceeding nutritional requirements

Using data from the FCS, this study finds that average protein intake among Thai individuals aged 13 years and older is 59.3 grams per day. When adjusted for body weight, this corresponds to 0.81 to 1.16 grams per kilogram, exceeding the recommended minimums established by the World Health Organization (WHO; 0.8 g/kg/day) and the European Food Safety Authority (0.83 g/kg/day). However, when assessed against Thailand's own Dietary Reference Intakes (DRIs), the picture is more nuanced: the average intake falls within the recommended range of 49 to 61 grams per day, and just slightly below or above the DRI range of 1.00 to 1.07 g/kg/day, depending on age and sex.

While the FCS data are now more than a decade old, they remain the most precise source of individual dietary intake in Thailand, as they are based on carefully administered single-day 24-hour recalls using a standardised protocol and nutrient-calculation software (INMUCAL). These estimates reflect conservative values, as they do not capture day-to-day variation or multi-day averages. Nonetheless, even this underestimate suggests that in general the Thai population is not only meeting but some groups are exceeding their physiological protein needs.

This conclusion is reinforced by data from the Thailand Household Socio-Economic Survey (HSES), which provides more recent and longitudinal information on dietary patterns. In all three survey years examined (2011, 2015, and 2019), the estimated per capita daily protein intake exceeds that reported in the FCS with 70.8, 72.7, and 91.2 grams per day, respectively. This suggests that actual protein consumption in Thailand has increased over the past decade, and that the FCS data likely understate current levels.

## Protein intake as a share of total energy

Notably, protein accounts for 16.6% of total energy intake among FCS participants, exceeding the WHO's reference range of 10–15% of daily energy from protein. This macronutrient imbalance is particularly significant given that the average total energy intake in the sample was only 1,431 kcal/day, well below the commonly referenced 1,540–2,370 kcal for adults. In other words, protein makes up a disproportionately large share of a relatively low total caloric intake, suggesting an over-reliance on protein at the expense of other food groups (e.g. fibre-rich vegetables).

## Gender and age patterns in protein intake

The data also show that men consume more protein than women on average:

- Men: 66.7 g/day (1.07 g/kg body weight)
- Women: 53.0 g/day (0.93 g/kg body weight)

This difference is largely driven by greater consumption of animal-based foods among men, as plant protein intake remains similar across sexes.

Across age groups, protein intake per kilogram of body weight declines with age: adolescents (13–17) and young adults (18–34) have the highest intakes per body weight, with 1.16 and 1.10 gram per kilogram respectively - well above international standards. In contrast, older adults (65+) consume 0.81 g/kg/day, just at or slightly below the recommended minimum.

## Urban–rural and regional differences

- Rural residents report slightly higher protein intake than urban residents (60.6 g/day vs 57.6 g/day), driven in part by higher fish and plant protein intake.
- At the regional level:
  - The Northeast has the highest plant protein intake.
  - The South has relatively balanced intake from both plant and animal sources.
  - Bangkok has the highest red meat and egg intake, and the lowest fruit and vegetable intake.

### 3.2 Animal protein dominates the Thai diet

Despite achieving protein sufficiency, the composition of protein intake in Thailand—dominated by animal sources—raises nutritional, health, and environmental concerns. Data from the FCS show that animal-source protein accounts for approximately 70% of total protein intake among individuals aged 13 years and older, while plant-based protein contributes only 30%. This imbalance is significant, particularly when benchmarked against the EAT-Lancet Commission's dietary recommendations, which advocate for a more plant-forward dietary pattern to support both human and planetary health.

Among animal sources, the largest contributors to protein intake were:

- Pork and beef
- Fish and seafood
- Poultry and eggs
- Processed meats (e.g. sausages, meatballs)

Together, these sources account for an average of 37.4 grams of protein per person per day, nearly two-thirds of total daily protein intake. In contrast, legumes, nuts, seeds, and soy products contribute only 0.5 grams of protein per day on average.

One notable exception among animal protein sources is dairy, which remains underconsumed relative to international standards. While the EAT-Lancet reference diet includes up to 250 grams of dairy per day (range: 0 to 500 g), Thai aged 13 years and over consume 37.33 grams per day on average. Nevertheless, total protein intake from animal sources still exceeds the EAT-Lancet recommended levels, indicating that low dairy intake does not compromise overall sufficiency. Looking ahead, rather than increasing dairy to match international targets, Thailand could consider promoting plant-based foods rich in calcium and other key micronutrients traditionally obtained from dairy.

These figures point to a heavily animal-reliant dietary pattern, diverging from more traditional Thai diets that historically included a wider array of plant-based protein-rich foods such as beans, peas, nuts, seeds, tofu, and other whole grains.

## Insights from the HSES: reinforcing the trend

Data from the HSES shows that animal protein consumption has increased steadily over time. Between 2011 and 2019, household food expenditures on meat, poultry, and eggs rose consistently, while spending on legumes, vegetables, and other plant-based staples remained stagnant or declined. This trend is especially pronounced in urban and higher-income households, reflecting shifts in consumer preferences, convenience, and accessibility of animal-based products.

Moreover, the HSES estimates suggest that actual quantities of animal protein available to households are higher than those reported in the FCS, indicating that the single-day 24-hour recall method may underrepresent habitual consumption. Processed animal products, in particular, may be underreported due to their frequent consumption outside the home or between meals.

## Sociodemographic patterns: gender, age, and region

- Men consume significantly more animal protein than women, with an average difference of ~10 grams per day.
- Adolescents and young adults (13–34 years) show the highest intake of animal protein, largely from pork, chicken, and eggs. In contrast, older adults rely more on fish and consume less red meat.
- Bangkok and the Central region report the highest consumption of meat and eggs, aligning with urbanisation and higher incomes.
- The South and Northeast display a more balanced intake, with relatively higher contributions from fish and plant-based sources.

## 3.3 Protein intake has increased over time

While the FCS provides a detailed snapshot of protein consumption in Thailand during 2013–2015, longitudinal data from the Household Socio-Economic Survey (HSES) reveal that per capita protein intake has been steadily increasing over the last decade. Using household expenditure data converted into food quantities and nutrient values, we estimate that:



| Year | Estimated protein intake (total) g/day | Estimated protein intake (Male) g/day | Estimated protein intake (Female) g/day |
|------|----------------------------------------|---------------------------------------|-----------------------------------------|
| 2011 | 64.9                                   | 70.9                                  | 59.4                                    |
| 2015 | 72.7                                   | 79.6                                  | 66.4                                    |
| 2019 | 91.2                                   | 99.8                                  | 83.3                                    |

These estimates indicate a ~40% increase in average protein intake over the eight-year period, even though Thailand had already surpassed minimum protein adequacy thresholds in 2011.

### Comparison with FCS data:

This HSES is greater than the FCS estimate of 59.3 g/day for 2013–2015, which likely underestimates true consumption due to the limitations of the single-day 24-hour recall method. The HSES methodology, while less precise at the individual level, provides stronger insights into population-level trends.

### Implications

While the increase in protein intake is not in itself problematic (especially in a country that has made significant progress in addressing undernutrition), the continued growth in protein consumption—particularly from animal sources—raises concerns:

- Protein is contributing a disproportionate share of total daily energy intake, especially when caloric intake remains below international recommendations in many groups.
- The increase in animal protein happens at the expense of consumption of fruits, vegetables, legumes, and whole grains, which are vital for fibre, micronutrients, and long-term health (expanded in the next section).

### 3.4 A shift toward animal-protein-rich diets may displace other essential food groups

Thailand's growing protein intake—particularly from animal sources—has not occurred in isolation. Evidence from both FCS and the HSES suggests that this shift may be contributing to the displacement of other important food groups, including vegetables, fruits, legumes, and whole grains, which are essential for long-term health and dietary adequacy.

### Declining or low intake of nutrient-dense plant foods

According to FCS data:

- Vegetables contribute only 2.6 g of protein/day (4.3% of total protein)
- Fruits contribute 0.88 g of protein/ day (1.5% of total protein)
- Legumes, nuts, and seeds products contribute less than 0.5 g of protein/day (under 1% of total protein).

These extremely low levels are not just a concern from a protein diversity standpoint, they also reflect low overall consumption of these food groups, which are primary sources of:

- Fibre
- Micronutrients (e.g. potassium, folate, magnesium, vitamin C)
- Protective phytonutrients linked to reduced risk of chronic diseases

This pattern is reinforced by the HSES, which shows stagnant or declining household expenditure on fruits, vegetables, and legumes between 2011 and 2019, even as spending on meat, eggs, and processed foods rose. This suggests that more household calories—and money—are being allocated to protein-rich foods at the expense of a diverse and balanced diet.