

Supplementary File

Fajarwaty et al. (Sustainable Diets in Southeast Asia: Development, Barriers, and Opportunities)

Tabel 2. Synthesis of data from included studies

No	Authors & year Title	Country & Journal	Objectives	Development of Sustainable Diets	Barrier	Opportunity
1.	Balancing a sustained pursuit of nutrition, health, affordability and climate goals: exploring the case of Indonesia. De Pee et al. (2021)	Indonesia The American Journal of Clinical Nutrition	To compare Indonesia's food utilization to diets optimized for nutritional value and cost and to diets that are increasingly plant-based in order to meet further health and environmental goals, including the EAT-Lancet planetary health diet, to explore whether multiple goals could be achieved simultaneously.	Efforts are being made to ensure that sustainable diets meet the nutritional needs of the population. This involves promoting the consumption of a variety of foods that provide essential nutrients while minimizing environmental impact.	<ul style="list-style-type: none"> largest country with a severe triple burden of malnutrition thus one of the primary challenges is balancing nutritional needs with environmental goals. the nutrition transition with a continued high intake of rice; increasing intake of foods high in sugar, unhealthy fats, and/or salt Affordability is a critical issue. the consumption of large quantities of rice and increasing consumption of unhealthy foods preclude inclusion of sufficient amounts of diverse, healthy foods. There may be insufficient infrastructure to support the production and distribution of sustainable food options. Limited data on national dietary intakes, regional variation of food prices and food expenditures, and food production's environmental burdens 	<ul style="list-style-type: none"> Rich Biodiversity be utilized to promote sustainable diets. There is an opportunity to diversify diets by reducing the consumption of rice and unhealthy foods,
2.	Environmental sustainability of food consumption in Asia Adhikari & Prapaspong (2019)	Thailand Sustainability (Switzerland)	To assess the environmental sustainability of food consumption in Thailand, India, China, Japan, and Saudi Arabia by using a life cycle assessment	Thailand has integrated sustainable agriculture policies into its National Economic and Social Development Plan. The primary goals of these policies are to encourage crop diversification, discourage the use of inorganic fertilizers and pesticides, and promote organic agriculture. This approach aims to mitigate the environmental impacts of intensive agriculture and foster more sustainable food production practices	<ul style="list-style-type: none"> cereals are identified as the highest contributor to global warming potential (GWP), accounting for 29% of the total GWP. the diet patterns in Thailand are distinct, with variations in the consumption of different food groups 	<ul style="list-style-type: none"> Thailand's National Economic and Social Development Plan (NESDP) provides a strong policy framework that supports sustainable agriculture. There is an opportunity to promote sustainable diets through adjustments in calorie intake. By reducing the overall consumption of each food group by 10%, Thailand can lower its environmental impacts.
3.	Turning Indonesia organic: Insights from transdisciplinary research on the challenges of a societal transformation Fritz et al. (2021)	Indonesia Sustainability (Switzerland)	to adopt a transdisciplinary approach to identify possible pathways towards organic agriculture. This involves analysing farmers' knowledge, barriers to adoption, value and belief systems, and institutional structures, including policies and regulations	the transformation of eating to organic agriculture in Indonesia as a pathway to sustainable food production. This transition is crucial due to the environmental costs associated with the Green Revolution technologies previously used in the country	<ul style="list-style-type: none"> lack of information and awareness about sustainable agricultural practices. limited understanding of the negative effects of agrochemicals and the benefits of organic farming. Economic barriers, such as limited access to credit, can hinder the adoption of organic farming practices, which are essential for sustainable diets. The uncertainty associated with changing from conventional to organic farming can deter farmers from making the transition, impacting the availability of sustainable food options 	<ul style="list-style-type: none"> Increasing engagement from both government policies and civil society initiatives in promoting organic agriculture. Social and ecological values, particularly those rooted in religious and cultural traditions, support small-scale production and local marketing.

4.	Meat-analog made from Javanese Grasshopper, kidney beans, and elephant foot yam as a high-protein and low-cholesterol product Priyatnasari et al. (2024)	Indonesia Journal of Agriculture and Food Research	to produce a sustainable alternative protein source by formulating a meat substitute derived from Javanese Grasshoppers	There is potential of using edible insects, such as the Javanese Grasshopper, as a sustainable protein source as it requires less water, land, and has a lower global warming potential compared to traditional livestock.	<ul style="list-style-type: none"> Significant population growth places a significant demand on food resources, particularly protein, making it challenging to maintain sustainable diets triple burden of nutrition problems, including undernutrition, overnutrition, and micronutrient deficiencies. a notable gap in the demand and availability of animal-based protein sources, which currently meet only 60% of the population's needs. Livestock emissions significantly contribute to Indonesia's agricultural greenhouse gas emissions, with beef cattle production being a major source. there may be cultural and acceptance barriers to incorporating insects into mainstream diets 	<ul style="list-style-type: none"> Indonesia has significant potential to utilize edible insects, such as the Javanese Grasshopper, as a sustainable and high protein alternative. There is an increasing awareness of the need for sustainable diets and innovative solutions to meet the nutritional needs of a growing population while minimizing environmental impacts.
5.	Wild food plants and trends in their use: From knowledge and perceptions to drivers of change in West Sumatra, Indonesia Pawera et al. (2020)	Indonesia Foods	to document the diversity of wild food plants (WFPs) in West Sumatra, Indonesia.	The development of sustainable diets in Indonesia has been challenged by the mainstream research and development's oversight of agrobiodiversity and wild food plants (WFPs).	<ul style="list-style-type: none"> the decreased availability of WFP due to agricultural intensification Socio-economic changes which influence food choices and accessibility that often lead to a preference for more convenient, processed foods over traditional, nutritious options. The Indonesian diet is heavily reliant on rice, leading to a monotonous diet with low intake of fruits and vegetables. 	<ul style="list-style-type: none"> Indonesia is one of the most bioculturally diverse countries in the world, with a wealth of wild and cultivated food plants. positive attitude toward WFPs to promote and integrate them into sustainable diets The strong cultural traditions in regions like West Sumatra help slow dietary changes and maintain the use of traditional foods which is the foundation for promoting sustainable diets that incorporate traditional and nutritious food
6	Toward a Sustainable Food System in West Papua, Indonesia: Exploring the Links Between Dietary Transition, Food Security, and Forests Nurhasan et al. (2022)	Indonesia Frontiers in Sustainable Food Systems	to discuss the dietary transition taking place in West Papua and uses local perspectives to explore the link between changes in diets, food security, and forests.	There is a suggestion to create local, sustainable dietary guidelines that adapt the current Indonesian national dietary guidelines to the local context, incorporating sustainability considerations.	<ul style="list-style-type: none"> West Papua is experiencing a shift from traditional foods to more rice and ultra-processed foods (UPFs). The shift from sago to rice is not environmentally sustainable The dependence on rice could compromise food security The transition to modern diets, including high consumption of UPFs, creates social and economic difficulties 	<ul style="list-style-type: none"> West Papua has a rich tradition of local food systems that include sago, tubers, wild meat, and fresh legumes which are not only culturally significant but also more sustainable compared to imported foods like rice and ultra-processed foods (UPFs). Sago is a climate-resilient crop that can be reharvested from the same clump every 2-3 years The central government has recommended reducing per capita rice consumption and diversifying staple foods beyond rice and wheat. There is commitment to maintain at least 70% of forest cover in West Papua, as stated in the Manokwari Declaration.
7	Beyond the Plate: Uncovering Inequalities in Fruit and Vegetable Intake across Indonesian Districts Darmawan et al. (2023)	Indonesia Nutrients	to identify disparities in inadequate fruit and vegetable (FV) intake among adults across 514 districts in Indonesia.	a significant challenge in achieving sustainable diets in Indonesia, with an alarmingly high prevalence of inadequate fruit and vegetable (FV) intake among adults, reaching 96.3% in 2018	<ul style="list-style-type: none"> high prevalence of inadequate fruit and vegetable (FV) intake among adults There are notable geographic and socioeconomic disparities in FV intake Access to diverse and affordable FV options is a challenge, particularly in rural and low-income areas. lower levels of education were linked to poorer FV diets 	<ul style="list-style-type: none"> local agricultural practices that support higher levels of fruit and vegetable (FV) consumption.

8	Taboos, food avoidances, and diseases: Local epistemologies of health among Coastal Endenese in Eastern Indonesia Keleman Saxena et al. (2023)	Indonesia <i>Frontiers in Sustainable Food Systems</i>	to gain a fine-grained understanding of local epistemologies of health among the Coastal Endenese in Eastern Indonesia. This involves exploring how cultural beliefs, taboos, and dietary avoidances influence health and dietary choices	The development of sustainable diets in Indonesia, particularly among the Coastal Endenese, emphasizes the importance of culturally sensitive programs.	<ul style="list-style-type: none"> • economic barrier limits access to essential nutrients and proteins, especially during periods when fishing activity declines, such as the full moon or monsoon storms • The presence of food taboos and avoidances, particularly those imposed on women • The Coastal Endenese face vulnerabilities due to climate change, extreme weather events, and overfishing, which disrupt their food systems. • Sociodemographic factors such as age, marital status, education levels, occupation, and place of residence significantly influence fish consumption preferences. 	<ul style="list-style-type: none"> • There is a significant opportunity to involve local communities in the development of culturally sensitive programs. • The Coastal Endenese have access to a diverse range of marine products, which are a primary source of animal protein
9	Healthy diets from sustainable production: Indonesia Vermeulen et al. (2019)		to highlight the double burden of malnutrition in Indonesia, where a significant percentage of children are stunted, and the incidence of overweight adults is increasing. It seeks to address these issues by promoting healthy diets from sustainable production	The Healthy Living Community Movement (GERMAS), initiated by presidential instruction in 2017, is one of the key policy initiatives promoting healthier lifestyles, including better diets. However, there is recognition that more needs to be done to fully integrate sustainable diets into public health efforts	<ul style="list-style-type: none"> • Indonesia's food system is inherently diverse due to its geography, culture, economics, and politics. This complexity makes it challenging to implement a coherent strategy for sustainable diets across the nation • There is a high degree of incoherence and ambiguity between regulatory frameworks, leading to contradictions across government agencies. • Although a moratorium on new licenses for land clearance on primary forests and peatlands was introduced, its effectiveness in preventing further clearance has been limited. 	<ul style="list-style-type: none"> • The Healthy Living Community Movement (GERMAS) promotes physical activity, regular health checks, and increased consumption of fruits and vegetables, supporting public health efforts • The commitments under the Nationally Determined Contributions (NDC) and the Sustainable Development Goals (SDGs).
10.	Development and preliminary validity of an Indonesian mobile application for a balanced and sustainable diet for obesity management. Agustina et al. (2022)	<i>BMC Public Health</i>	to develop a mobile application named wild plants Up® that aids in promoting a balanced and sustainable diet specifically tailored for obesity management. This involves creating an app that can track dietary intake and provide menu recommendations based on caloric targets	There is a mobile application, EatsUp®, to promote balanced and sustainable diets. This development is a step towards integrating sustainable dietary practices into everyday life in Indonesia	<ul style="list-style-type: none"> • incomplete Indonesian food composition table. The application relies on the 2007 Nutri Survey food database, which is outdated and may not accurately reflect current food consumption patterns or nutritional content, posing a challenge to providing precise dietary recommendations. • many participants lacked knowledge about balanced and sustainable diets. • 	<ul style="list-style-type: none"> • The app developed in the study, EatsUp®, is designed to promote balanced and sustainable diets by providing menu recommendations, health news, and notifications. This focus on sustainability is an enabling factor as it aligns with global trends towards healthier and more environmentally friendly eating habits
11	Much More Than Food: The Malaysian Breakfast, a Socio-Cultural Perspective Poulain et al. (2023)	Malaysia <i>Sustainability (Switzerland)</i>	to explore the ethnocultural dimensions and social functions of breakfasts within the Malaysian population.	the ethno-cultural dimensions of food habits are now on the Malaysian research agenda. This indicates a growing recognition of the importance of cultural factors in dietary practices, which is a positive step towards implementing sustainable diets	<ul style="list-style-type: none"> • the difficulty of considering these factors, which are crucial for addressing cultural differences and social hierarchies in dietary practices • The "nutritionalisation" of modern societies can create conflicts between sociocultural norms and nutritional guidelines. • cultural influences sometimes clash with nutritional recommendations, making it challenging to promote sustainable diets • Malaysia faces significant public health challenges, such as non-communicable diseases and obesity. 	<ul style="list-style-type: none"> • Malaysia's rich cultural diversity, with its blend of Malay, Indian, Chinese, and other ethnic influences, provides a strong foundation for promoting sustainable diets. • The country is increasingly recognizing the importance of sociocultural dimensions in dietary practices. • There are efforts to integrate cultural characteristics into public health nutrition strategies.

12	Barriers and benefits arising from the adoption of sustainable certification for smallholder oil palm producers in Malaysia: A systematic review of literature	Malaysia	to explore the adoption of sustainable certification among smallholder oil palm producers in Malaysia.	Given Malaysia's focus on sustainable agricultural practices, there is potential for the development of sustainable diets.	<ul style="list-style-type: none"> The high cost of implementing sustainable practices and obtaining certification is a significant barrier. 	<ul style="list-style-type: none"> The Malaysian government is actively promoting sustainability through initiatives like the Malaysia Sustainable Palm Oil (MSPO) certification. There are incentives which can encourage producers to adopt sustainable practices. The adoption of international sustainability standards
13	Aziz et al. (2021) Development and validation of a sustainable diet index among Malaysian adults: Protocol	Malaysia	to describe the protocol for developing a Sustainable Diet Index (SDI) among Malaysian adults.	The development of a Sustainable Diet Index (SDI) in Malaysia marks a pioneering effort to assess sustainable diet practices in the country. The study related to this index was completed by June 2020	<ul style="list-style-type: none"> the absence of guidelines or recommendations in Malaysia that integrate both health and environmental aspects. There is a scarcity of research on sustainable diets in Malaysia. carbon footprint of food items data is not readily available in Malaysia. Current Malaysian Dietary Guidelines emphasize health aspects through their key messages, but they do not adequately address sustainability. 	<ul style="list-style-type: none"> Malaysia has taken a significant step by developing a Sustainable Diet Index (SDI) The development of the SDI was informed by international guidelines and studies, including those from the Sustainable Development Commission, Food and Climate Research Network, Italian Barilla Center for Food and Nutrition, and WWF-UK Livewell. Malaysia demonstrates commitment to developing tools and strategies that promote sustainable diets
14	Zulkefli & Moy (2021) Understanding Malaysian consumers perception and acceptability of plant-based alternatives to chicken: Do texture, taste, and environmental impact matter?	Malaysia	to understand Malaysian consumers' perceptions and acceptance of plant-based alternatives (PBAs) to chicken.	There has been a gradual increase in the trend of consuming plant-based products in Malaysia, driven by health consciousness and awareness of the environmental impact of meat-based diets	<ul style="list-style-type: none"> the low acceptance of plant-based alternatives (PBAs) among consumers, particularly meat eaters. Current commercialized PBAs often contain a mixture of plant-based proteins like legumes, grains, and nuts, which can result in odd flavors and textures compared to meat products. only a limited number of participants were aware of the adverse environmental and health effects of a meat-based diet Meat has been a staple food for millennia, and there has been an upward trend in meat consumption due to economic growth and urbanization. 	<ul style="list-style-type: none"> There is an increasing trend of consuming plant-based products due to rising health consciousness and awareness of the environmental impact of meat-based diets. Plant-based alternatives (PBAs) are recognized for their health benefits, including lower cholesterol and total fat content compared to regular meat products. PBAs are significantly more sustainable than meat products, requiring less water and producing fewer greenhouse gas emissions.
15	Tan & Cheng (2024) Towards calorie-adequate diets to mitigate environmental impacts from food consumption in Asia	Myanmar, Malaysia, Indonesia, Laos, Vietnam	to investigate the environmental impacts of diets in Asian countries.	There is limited research on sustainable diets in Asian countries, which have unique characteristics due to variations in socioeconomic status, culture, food systems, consumption patterns, and nutritional challenges.	<ul style="list-style-type: none"> High Cost of Nutrient-Rich Foods There is limited research on diets in Asian countries, which have diverse characteristics due to variations in socioeconomic status, culture, food systems, consumption patterns, and nutritional challenges. Over 25% of anthropogenic greenhouse gas emissions come from food consumption conversion of natural landscapes to agricultural land for food production has significant environmental impacts. 	<ul style="list-style-type: none"> Growing recognition of the significant environmental impacts associated with food consumption
	S. Y. Lin et al. (2024)					

16	Transforming food systems in Maritime Southeast Asia and Pacific Small Island Developing States to support food security and sustainable healthy diets Chin et al. (2024)	Maritime Southeast Asia (MSEA) and Pacific Small Island Developing States (PSIDS)	to address several key objectives related to transforming food systems in Maritime Southeast Asia (MSEA) and Pacific Small Island Developing States (PSIDS) to support food security and sustainable healthy diets <i>Frontiers in Sustainable Food Systems</i>	how far is the development or implementation or progress of sustainable diets in the country? what are the objectives of this paper? What are the barriers or challenges faced by the country in terms of sustainable diets? What are the enabling factors that the country has in terms of sustainable diets?	<ul style="list-style-type: none"> • Agriculture, a key component of food supply, is a leading cause of deforestation in the region, which is a global biodiversity hotspot. • ineffective policies that fail to adequately address the challenges of food security and sustainable diets. • The adoption of Western food systems and culture, including the consumption of ultra-processed unhealthy food, is prevalent. • Access to fruits and vegetables is often limited, particularly for the urban poor who have little to no access to land for subsistence production. • The region's countries are vulnerable due to factors like small annual Gross National Income (GNI), rapid population growth, and limited purchasing power. 	<ul style="list-style-type: none"> • The region's rich biodiversity, particularly in underutilized crops, can be harnessed to enhance food security and nutrition • Innovations and digitalization in food systems • The region is experiencing rapid economic growth and improved international connectivity which can facilitate the adoption of sustainable practices
17	Positive Diet Supporting Sustainable Development Aims: Functional Food Intake among Malaysians Mahjom et al. (2021)	Malaysia	to explore the practice of a positive diet involving functional foods among Malaysians.	a high level of awareness and positive perception among Malaysians regarding the intake of functional foods, which are considered a component of sustainable diets.	<ul style="list-style-type: none"> • Lack of awareness and knowledge about the benefits of functional foods. • disparity in accessibility of functional food of functional foods • The high cost of functional foods 	<ul style="list-style-type: none"> • The Malaysian Ministry of Health has outlined requirements to prioritize health functional foods, promoting a healthy lifestyle.
18.	The contribution of thai fisheries to sustainable seafood consumption: National trends and future projections Sampantamit et al. (2021)	Thailand Foods	to explore the supply trends of fishery products in Thailand over the last decade.	Thailand's use of low-value fish for products like fish meal and sauces suggests a low rate of fish discarding, which is a positive step towards reducing waste and promoting sustainability in seafood consumption	<ul style="list-style-type: none"> • The expansion of aquaculture which can cause environmental degradation • The destruction of oceanic ecosystems and depletion of fish stocks threaten the sustainability of seafood supply • Considerable seafood loss and waste • Economic factors, such as rising diesel price 	<ul style="list-style-type: none"> • Thailand effectively uses low-value fish, which are often discarded in other countries • There is nutrient-dense small fish such as from the engraulidae family, are rich in nutrients like calcium and are typically inexpensive
19.	The Effectiveness of Promoting a Vegetable and Fruit Consumption Behavior Program among Preschool Children in Nakhon Si Thammarat Province, Thailand Wiriyasirikul et al. (2023)	Thailand Foods	to design a program that promotes fruit and vegetable consumption behaviors among preschool children.	there are efforts to promote the consumption of fruit and vegetable which is part of sustainable diets practice	<ul style="list-style-type: none"> • There is a noticeable decline in the consumption of fruits and vegetables among preschool children. • Children's fruit and vegetable consumption is influenced by household income. • There is a scarcity of programs that manage the environment to promote fruit and vegetable intake. 	<ul style="list-style-type: none"> • There are efforts to develop programs that educate both children and caregivers about the benefits of fruit and vegetable consumption.
20	Aquaculture production and its environmental sustainability in Thailand: Challenges and potential solutions. Sampantamit et al. (2020)	Thailand <i>Journal of Cleaner Production</i>	to analyze the trends and changes in aquaculture production in Thailand over recent decades. This includes assessing the growth in production and its contribution to socio-economic development	To reduce reliance on fishmeal and fish oil in aquafeed production, studies are exploring alternative protein sources such as algae meal, wheat gluten, corn gluten, and insects. This shift is essential for sustainable aquaculture and, consequently, sustainable diets	<ul style="list-style-type: none"> • The rapid development of aquaculture in Thailand has led to significant environmental challenges, including habitat destruction, water pollution, and ecological imbalances. • the reliance on wild fish, particularly trash fish, to feed farmed fish and shellfish. • The discharge of waste from aquaculture farms can lead to eutrophication, which degrades water quality and affects aquatic life 	<ul style="list-style-type: none"> • The Thai government has been proactive in promoting sustainable aquaculture practices. • Research and development efforts in Thailand have focused on finding alternative protein sources to reduce reliance on fishmeal and fish oil in aquafeed.

21	Sustainable food consumption: Investigating organic meat purchase intention by vietnamese consumers.	Vietnam	to identify and analyze the factors that enhance or impede consumer intention to purchase organic meat in Vietnam.	Encouraging organic meat purchase is particularly important in Vietnam, where meat is among the most consumed food products by households and consumers are increasingly concerned about meat products that contain banned antibiotics and residues	<ul style="list-style-type: none"> high cost of organic meat In Vietnam's collectivist culture, the opinions of important others significantly influence consumer decisions. If organic meat consumption is not perceived as a social norm, it can hinder the adoption of sustainable diets There is a level of distrust in certified organic labels and skepticism about the authenticity and benefits of organic products. The limited availability of organic products 	<ul style="list-style-type: none"> growing interest of organic products Vietnamese consumers are increasingly aware of the environmental and health benefits associated with organic products. If key influencers and social norms support organic consumption, it can positively impact consumer behavior towards sustainable diets
22	Healthy or Environmentally Friendly? Meat Consumption Practices of Green Consumers in Vietnam and Switzerland	Vietnam	to explore the reasoning and challenges faced by green consumers in Vietnam and Switzerland regarding meat consumption.	In Vietnam, meat consumption is increasing due to factors like the rise of the middle class, improved income, and Western dietary influences.	<ul style="list-style-type: none"> In Vietnam, meat is considered a central part of daily meals and essential for special occasions like weddings and family gatherings. In Vietnam, plant-based meat alternatives are not widely available, and there is skepticism about their naturalness. There is a lack of information about sustainable consumption in Vietnam 	<ul style="list-style-type: none"> The increasing middle class in Vietnam is becoming more interested in healthy and sustainable lifestyles. Historically, vegetarianism was common in Vietnam for religious and economic reasons.
23	Sustainable consumption behaviors of young people in the field of food and drinks: A case study	Vietnam	to measure and understand the sustainable consumption behaviors of young people, particularly students, in the field of food and drinks.	In Vietnam, sustainable consumption is still a relatively new concept. Although Vietnamese consumers exhibit some sustainable consumption behaviors, there is a lack of understanding about its importance and the need to develop healthy consumption habits in daily life	<ul style="list-style-type: none"> lack of understanding about the importance of sustainable consumption and the creation of healthy consumption habits limitations in exploring the influence of religion and gender on sustainable consumption behaviors. 	<ul style="list-style-type: none"> Vietnam has integrated sustainable production and consumption into its national strategy, as emphasized in the "Strategic Orientation for Sustainable Development in Vietnam" for the period 2011-2020 Students are seen as a critical group for shaping future consumption patterns, and their engagement in sustainable practices can significantly impact sustainable diets.
24	Investigating and stimulating sustainable dairy consumption behavior: An exploratory study in Vietnam	Vietnam	exploring drivers and barriers to sustainable dairy consumption in Vietnam	The awareness and the level of sustainable dairy consumption in Vietnam are still low. However, there is a positive trend towards adopting more sustainable dairy consumption practices	<ul style="list-style-type: none"> Food attributes: Food attributes Health, Nutrition, Quality, Certification, Brand, Package, and Favorite Taste or Flavor. Personal factors: Habit, Trust, Preference, Lifestyle, Knowledge, and Demographic characteristics. Social context: Family, Social norms, Reference groups, Tradition, and Ethical beliefs or Religion. Economic and marketing factors: Price, Promotion or Discount, Communication, Advertising, and social networks. Environment and physical context: Place of purchase, Area of residence, Working location, Retail display, and Quality of living environment. Political and policy measures Safety regulations, Quality regulations: Subsidies, and Supporting projects. 	<ul style="list-style-type: none"> Food attributes: Unfavored new taste or different flavor, inadequate value. Personal factors: Unsuitable Habit & Preference, lack of trust, lack of knowledge, and insufficient information. Social context: Unsuitable Tradition or Family habit, Social negative pressure. Economic and marketing factors: High price, miscommunication. Environment and physical context: Unavailability of sustainable products, difficult access to the place of purchase. Political and policy measures: Potential negative impact of over subsidies and support.

25	Environmental analyses to inform transitions to sustainable diets in developing countries: case studies for Vietnam and Kenya	Vietnam <i>International Journal of Life Cycle Assessment</i>	Heller et al. (2020)	This study uses existing data to provide a diet-level perspective on environmental impact from food production in the case study countries of Vietnam and Kenya	the environmental performance of food production systems in Vietnam is still lack of data	<ul style="list-style-type: none"> limited availability and accuracy of data. the use of food balance sheets as proxies for national diets is a crude approximation and does not accurately represent dietary intake, making it difficult to assess nutritional adequacy There is a scarcity of Life Cycle Assessment (LCA) data from Southeast Asia and Africa, which are crucial for understanding the environmental impact of food production. Methane emissions from agriculture, particularly from cattle and rice production, are significant contributors to GHGE 	<ul style="list-style-type: none"> Vietnam is experiencing rapid economic development Vietnam's centralized government structure may allow for more streamlined policy implementation The steady rise in average incomes can increase consumer purchasing power The concept of sustainable diets is aligned with several SDGs, such as poverty eradication, zero hunger, and climate action.
26	Conceptualizing sustainable diets in Vietnam: Minimum metrics and potential leverage points	Vietnam <i>Food Policy</i>	Mayton et al. (2020)	to develop a conceptual framework for sustainable diets that is locally relevant to Vietnam. This framework is designed to be generalizable to other developing countries, providing a model that can be adapted to different contexts	this research offers an approach to grounding sustainable diet frameworks in order to employ them for contextually appropriate decisions and actions. Further, this framework and process of identifying leverage points presents a strategy that could be used to approach diverse Sustainable Development Goals (SDGs).	<ul style="list-style-type: none"> the uncoordinated policy approaches to promote sustainable diets. The interconnected domains of sustainable diets are complex, and this complexity poses a barrier when translating them into public policy decisions. There are significant data gaps, particularly in areas like food loss and waste. Vietnam's unique vulnerability to climate change 	<ul style="list-style-type: none"> Vietnam has developed a conceptual framework that includes 235 unique, measurable indicators across eight domains. The use of participatory workshops, which brought together 50 Vietnamese stakeholders from various areas of expertise The identification of key leverage points, such as food quality and safety, agricultural chemical usage, food waste, and water management
27	Diets, food choices and environmental impacts across an urban-rural interface in Northern Vietnam.	Vietnam <i>Food Policy</i>	Trinh et al. (2021)	to analyze the environmental impacts of diets and food choices across a rural urban transect in Northern Vietnam.	the average greenhouse gas emissions (GHGE) from diets in rural districts were lower compared to urban and peri-urban areas. This suggests that rural diets might be more environmentally sustainable, although they may still lack diversity and nutritional quality	<ul style="list-style-type: none"> nutritional triple burden, which includes obesity, stunting, and micronutrient deficiencies. significant environmental impacts associated with current dietary patterns, such as high greenhouse gas emissions (GHGE) from pork and beef consumption There are significant differences in diet-related environmental impacts across different socio-demographic groups. There is a lack of detailed data on the environmental impacts of individual dietary components in Vietnam 	<ul style="list-style-type: none"> Urban households in Vietnam have shown a preference for prioritizing personal health and the natural content of food. In rural areas, households often produce their own food, which can reduce the environmental impact
28	The Role of Healthy Diets in Environmentally Sustainable Food Systems	Vietnam <i>Food and Nutrition Bulletin</i>	Clark et al. (2020)	to explore how healthy diets can contribute to sustainable food systems. It emphasizes the importance of dietary transitions towards healthier patterns to achieve health and environmental sustainability targets	Fisheries and aquaculture play a significant role in Vietnam's economy and food system. Nearly 8% of the population derives their main income from this sector. However, the sustainability of these systems is crucial, as overexploitation and environmental concerns are prevalent. Improving the sustainability of fishery and aquaculture systems is essential for long-term economic security and sustainable diets	<ul style="list-style-type: none"> Double Burden of Malnutrition The rapid increase in aquaculture to meet the demand for fish has led to environmental concerns. Many of Vietnam's marine and inshore fisheries are overexploited Dietary changes in Vietnam are expected to increase per capita diet-related greenhouse gas emissions by 45%, primarily due to higher consumption of beef, pork, and poultry. Economic growth and cultural preferences for animal-source foods make it difficult to shift diets towards more plant-based option 	<ul style="list-style-type: none"> Vietnam's abundant natural resources The Vietnamese government has implemented specific efforts to prioritize nutrition, such as the National Nutrition Strategy and policies to improve infant and young child feeding practices. The existing infrastructure and expertise in fish production can be leveraged to promote sustainable diets by increasing fish consumption cultural preference can be an enabling factor in promoting fish as a sustainable alternative to higher-impact animal-source foods like pork and beef

29	Dietary Change and Global Sustainable Development Goals C. Chen et al. (2022)	Indonesia, Thailand, Malaysia, and other regions in the world <i>Frontiers in Nutrition</i>	to bring together the existing knowledge on heterogeneity of current dietary patterns across the world and how a transition toward healthy diets in different countries can aid in progress toward multiple global Sustainable Development Goals (SDGs).	Indonesia, Thailand, and Malaysia are major exporters of products like palm oil, which are associated with high biodiversity losses. This indicates a substantial environmental footprint linked to their agricultural practices, which is a critical factor in assessing the sustainability of diets in these regions	<ul style="list-style-type: none"> high biodiversity loss associated with their agricultural exports. The cultivation of crops like palm oil and sugarcane is resource-intensive and contributes to environmental degradation. The affordability of healthy and sustainable food options is a common challenge in many regions. Traditional food preferences and practices may resist change, even when healthier and more sustainable options are available. 	<ul style="list-style-type: none"> the rich biodiversity in these countries These countries have significant experience in agriculture, particularly in the production of staple crops and other commodities like palm oil and coconut. Being part of Southeast Asia, these countries can benefit from regional collaboration and shared initiatives aimed at promoting sustainable diets.
30	The role of aquatic foods in sustainable healthy diets Ahern et al. (2021)	Thailand and other regions in the world <i>UN Nutrition Discussion Paper</i>	to build consensus on the role of aquatic foods in sustainable healthy diets, presenting the breadth of evidence available to inform and steer policy, investments and research to make full use of the vast potential of aquatic foods in delivering sustainable healthy diets and meeting the Sustainable Development Goals (SDGs)	Thailand's FBDG is highlighted in the paper for illustrating a wide variety of aquatic foods. This reflects the diversity of aquatic foods that are common in the diets and production systems in Thailand. The guidelines are part of efforts to align with sustainable healthy diets by promoting diverse and nutritious food options	<ul style="list-style-type: none"> lack of a well-defined and robust narrative to promote sustainable healthy diets The absence of coherent policy and strong institutional frameworks. The recommended dietary guidelines have been criticized for not recognizing cultural and individual dietary choices and for being unaffordable, especially in low- and middle-income countries 	<ul style="list-style-type: none"> The publication of planetary health guidelines by the EAT-Lancet Commission and the Principles for Sustainable Healthy Diets by the FAO and WHO provide a framework that countries, including Thailand, can align with to promote sustainable diets the potential of aquatic foods in delivering sustainable healthy diets.
31.	Sustainability of the Philippine food system Goloso-Gubat et al. (2024)	Philippine <i>Frontiers in Sustainable Food Systems</i>	To characterize the status of the Philippine food system at the national scale, utilizing the SNS indicators to identify key areas for improvement, collaboration, and transformation.	The Philippine food system has been assessed to have low performance scores in several critical areas that are essential for sustainable diets. These areas include resilience, food nutrient adequacy, ecosystem stability, and food safety.	<ul style="list-style-type: none"> The Philippine food system is characterized by low diversity in food production, which affects the nutritional diversity of the food supply and the overall resilience of the food system. There is a strong emphasis on achieving rice self-sufficiency, which has been a priority since the food crisis of 2007 and 2008. Socioeconomic Disparities The perception of food security is heavily skewed towards food self-sufficiency, particularly for rice. 	<ul style="list-style-type: none"> The Philippine food system scores relatively well in terms of sociocultural wellbeing. The country has achieved better scores in food affordability and availability compared to other metrics. The country has a low per capita land use score, partly due to the relatively small contribution of meat in the Filipino diet. The Philippines primarily uses energy for cooking and consumes less non-renewable energy for food production, processing, and transport.
32	Building a Community: A Key in Sustainable Eating Lifestyle of Young Urban Professionals. Godinez (2022)	Philippine <i>LSU Research Congress 2022</i>	to provide an in-depth analysis on how a community affects their sustainable eating lifestyle.	The paper highlights that there is minimal data available on the prevalence of sustainable eating lifestyles, such as vegetarianism and veganism, among Filipinos.	<ul style="list-style-type: none"> the difficulty in sourcing sustainable food. This includes finding local, seasonal, and eco-friendly produce, which is a core component of a sustainable diet difficulties in preparing meals that align with sustainable eating practices, which often require more time, effort, and knowledge about sustainable ingredients and cooking methods difficulties in finding and building a community that supports sustainable eating is also a challenge. 	<ul style="list-style-type: none"> Young urban professionals (YUPs) are knowledgeable about the benefits and effects of a sustainable eating lifestyle. The presence of a supportive community YUPs prefer to work in institutions that support their sustainable eating lifestyle. The increasing concern about environmental issues and the rise of obesity-related diseases motivate YUPs to adopt sustainable eating habits

33	Myanmar local food systems in a changing climate: Insights from multiple stakeholders Thant et al. (2022)	Myanmar <i>Frontiers in Nutrition</i>	to understand the dynamics of climate change, agriculture, food security, and consumption.	the diets in Myanmar, particularly in rural areas like Htee Pu Village, are characterized by low dietary diversity. The most consumed foods are rice, meat, and fresh vegetables, while fruits, root crops, and processed fruits are less common.	<ul style="list-style-type: none"> The diets in Htee Pu Village are perceived as inadequate in quantity by food system actors. Low-income families often select diets based on price, leading to the consumption of foods that are not nutrient-dense. The location of the village affects the price and availability of some food commodities. Climate change negatively impacts farming and agricultural practices, disrupting the input supply of local food systems. 	<ul style="list-style-type: none"> Myanmar has the potential to build enabling environments through collaboration between government partners, experts from multiple organizations, and food system actors. There are ongoing capacity-building sessions for various actors, which provide a forum to share evidence-based information and develop policy recommendations. The private sector plays a strategic role in transforming food systems
34	Examining the trade-offs of palm oil production and consumption from a sustainable diets perspective: Lessons learned from Myanmar Downs et al. (2022)	Myanmar <i>Public Health Nutrition</i>	to examine the trade-offs related to the production and consumption of palm oil in Myanmar from a sustainable diets perspective.	The studies discusses the inherent trade-offs in sustainable diets, which encompass health, environmental, social, and economic dimensions. These trade-offs are particularly pronounced in the context of palm oil production and consumption in Myanmar, where there are coordinating disincentives from a sustainable diets perspective	<ul style="list-style-type: none"> relatively low productivity levels in palm oil sector a low preference for palm oil consumption among consumers in Myanmar compared to traditional oils. Poor production practices in palm oil cultivation contribute to negative environmental impacts, such as deforestation, and social issues, including land conflicts. Promoting sustainable diets is complicated by land competition and climate variability, particularly in low- and middle-income countries like Myanmar 	<ul style="list-style-type: none"> Consumers in Myanmar have expressed strong preferences for traditional oils such as groundnut and sesame.
35	Timor Leste strategic Review: Progress and Success in Achieving the Sustainable Development Goal 2 Davis (2017)	Timor-Leste	to conduct a strategic review to assess the progress and success of Timor-Leste in achieving Sustainable Development Goal 2 (SDG 2), which focuses on ending hunger, achieving food security, improving nutrition, and promoting sustainable agriculture	Timor-Leste faces significant challenges in achieving sustainable diets due to low dietary diversity. Fish, providing essential proteins and micronutrients. However, the sustainability of fish, which is recognized as an important resource for nutrition in Timor-Leste, is threatened by unsustainable fishing practices and climate change. The country relies heavily on rain-fed subsistence agriculture, which affects food security and the ability to maintain a sustainable diet.	<ul style="list-style-type: none"> the insufficient financial commitment from the government towards nutrition and agriculture. The lack of an enabling environment seasonal gaps in food supply, lack of promotion of local foods, and the dominance of imported foods There is a lack of nutrition education, with many people not understanding the role of nutritious foods and how to prepare healthy meals. Traditional ceremonies in Timor-Leste consume large amounts of resources, including food and money, which could otherwise be used for nutrition. 	<ul style="list-style-type: none"> Timor-Leste has shown a degree of commitment to improving food security and nutrition outcomes. The country has mechanisms in place, such as efficient systems and institutional capacity There are existing policies that incorporate food-based and agricultural objectives, which can be further developed to include explicit nutrition-focused goals.
36	Can fixing dinner fix the planet? Fanzo (2021)	Several countries in the world including Southeast Asian Countries (Timor-Leste, Thailand, Myanmar)	to address the complex interplay between nutrition, sustainability, and development in Timor-Leste and beyond, providing insights into how these challenges can be navigated for better outcomes.	The traditional diet of Timor-Leste was rich in roots and tubers, such as sweet potato, yam, and taro, which are more nutritious and diverse compared to the predominantly rice-based diet introduced later. This shift has implications for both health and sustainability, as the traditional diet was more aligned with sustainable practices The diets in Myanmar are diverse but of low quality, with a preference for fruits, vegetables, and red meat. However, the consumption of high-fat, high-sodium street food is prevalent due to its affordability and availability	<ul style="list-style-type: none"> A significant portion of the Timorese population has limited access to meat, animal-source foods, pulses, and fruits, which are often reserved for special occasions. After decades of conflict, Myanmar is on a path to sustainable development, but the transition is complicated by the need to address both undernutrition and obesity simultaneously 	<ul style="list-style-type: none"> The Timorese government is actively working to boost domestic rice production to reduce reliance on imports, which can be a step towards food sovereignty and sustainability There is an opportunity to encourage the production of diverse and nutritious foods, such as pulses, tubers, vegetables, and fruits, which can enhance nutritional resilience and support sustainable agriculture Many Burmese express a preference for fruits, vegetables, and red meat over processed foods

37	Status of Food Security in East and Southeast Asia and Challenges of Climate Change H. I. Lin et al. (2022)	various countries in East and Southeast Asia (Vietnam, Thailand, Indonesia, Philippines, Cambodia, Myanmar)	to explore and analyze various aspects of food security in East and Southeast Asia, with a particular focus on the challenges posed by climate change.	In Southeast Asia, there has been an increase in cereal supplies from 2014 to 2018. However, while wheat and wheat products saw a significant increase, rice and rice products experienced a slight decrease in availability. The supply of vegetables is relatively low in Southeast Asia compared to East Asia. However, the supplies of meat, eggs, and seafood have grown steadily from 2014 to 2018	<ul style="list-style-type: none"> The increased frequency of extreme weather events such as droughts, floods, and storms poses significant threats to agriculture Economic disparities There is a negative relationship between the percentage of the population using basic drinking water services and the prevalence of undernourishment. 	<ul style="list-style-type: none"> Southeast Asian countries benefit from increased exposure to the global market
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Following the study selection process, the included articles were systematically analyzed. Table 2 presents the extraction of key information from each study. To ensure consistency and transparency, a set of guiding questions was developed as part of the Stage 4 PRISMA systematic review (data extraction and synthesis). These questions allowed us to examine comparable aspects across studies, including substantive dimensions and methodological features, as listed below:

1. What are the stated objectives of the study?
2. How does the study contribute to the development of sustainable diets?
3. What barriers to sustainable diets are identified in the study?
4. What opportunities are highlighted that could facilitate sustainable diets?
5. Which country(ies) and context does the study focus on?

Table 2 summarizes the extracted information from the included studies according to these guiding questions.