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**THE NEXUS OF PLANNING AND FOOD SECURITY IN INDONESIA:
 A REVIEW OF THE LITERATURE**

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ABSTRACT

This review paper draws on a multidisciplinary body of literature to consider how planning can foster food security in Indonesia. In the last decades, the international planning discourse has been increasingly attentive to a range of food security issues such as food deserts, urban agriculture, rural agricultural land conservation and resilient food systems. The existing studies mainly explore how planning can be more sensitive to food issues. However, to what extent Indonesian studies are attentive to the intersection of food and planning has not been clarified yet. This paper addresses this gap by reviewing 38 published studies in Indonesia to investigate how the existing studies in Indonesia link food security with planning. Food, as one of three primary needs, should be the concern of planners, especially in this era of uncertainties and global environmental change. Establishing food security should involve multidisciplinary research, including planning which can potentially contribute to managing the spatial dimensions of food production, distribution and utilisation.

Keywords:

Planning, food security, systematic literature review.

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1. Introduction

The planning literature across the globe has been increasingly attentive to food-related issues in the last decades (Cabannes and Marocchino, 2018; Moragues-Faus and Battersby, 2021; Raja et al., 2014; Soma et al., 2022). Some relate food security with rural or agricultural development (e.g. Caldwell et al., 2020; Chigbu et al., 2019). Some studies highlight the significant role of planning in conserving agricultural land in the era of rapid urbanisation (e.g. Chen et al., 2021; Perrin et al., 2020). The most recent literature focuses on urban food security, such as studies on urban agriculture (e.g. Cinà and Khatami, 2017; Horst et al., 2017; Marat-Mendes et al., 2021; Meenar et al., 2017; Simatele et al., 2012; Steenkamp et al., 2021) and urban food deserts (e.g. Abel et al., 2022; Hamidi, 2020; Khadem et al., 2022). Some studies have also discussed the role of planning in enhancing the integration of food-energy-water (e.g. Brinkley et al., 2022; Raub et al., 2021; Roggema and Yan, 2019).

However, how Indonesian scholarly literature discusses food security and planning integration remains poorly understood. It is also still unclear what types of food security-planning intersections are suggested in the existing Indonesian literature. Therefore, this review

addresses this gap by investigating how Indonesian studies link food security issues with planning. Although there have been many literature review papers discussing the intersections of planning and food security, this Indonesian-focused literature review is needed to identify research gaps for designing future research. This paper may also contribute to the literature on Indonesian planning theory by examining the development of food security issues in Indonesian planning studies.

In this paper, we first outline how this literature review defines food security and briefly explain how planning can potentially support food security. Different forms and approaches in planning and related disciplines will be discussed and linked to different aspects of food security. Afterwards, we explain how this literature review was conducted. Following this, we present and discuss the findings of our review by emphasising four aspects: (1) Time and location; (2) Dimensions of food security accommodated; (3) Research design applied; (4) Connections between food security and planning. Finally, this paper summarises the findings and provides suggestions for future research.

2. Defining Food Security and Planning

Food security is defined as a condition when all people have a continuous, sufficient and accessible (physically, socially and economically) supply of safe and nutritious food suited to their preferences and keeps them active and healthy (FAO, 2008). Efforts to establish food security cover not only the elements of food availability but also comprise accessibility, utilisation and stability dimensions (Lang and Barling, 2012; FAO, 2008). Recently, the High-Level Panel of Experts on Food Security and Nutrition (HLPE, 2020) added agency and sustainability as elements of food security.

Furthermore, a discussion on food security cannot be separated from the food systems (Ericksen, 2008). A food system is defined as a network of food-related activities that range from production, processing, distribution, retailing and consumption (Ackerman et al., 2014; Steenkamp et al., 2021). The arrangement of linked activities within a food system creates several consequences, including food security. Therefore, this paper combined the six food security dimensions and five food system components mentioned in Steenkamp et al. (2021) as the framework to examine the existing literature on food security and planning in Indonesia.

In this paper, the term “planning” refers to urban and regional planning, which encompasses a range of processes of managing the dynamics of human activities and physical arrangements across various spatial scales ranging from neighbourhoods and cities to regions (Eckert and Padilha, 2021; Gunder et al., 2017). Planning is a multidisciplinary field of study. It brought together geographers, architects, landscape architects, engineers, environmental scientists, sociologists, economists and other social scientists to solve urban and regional problems. Therefore, this review is not limited to published papers from planning journals but includes a multidisciplinary body of literature. Besides, planning concerns various urban/regional elements such as population, economic development, land use, buildings, infrastructures, mobility, public open spaces, resources, and the natural environment. Several urban and regional planning types focus on a particular urban/rural element, for example, land use, environmental, economic development, transportation, and infrastructure planning. However, these types of planning must not be viewed as isolated entities, but they must be integrated. Hence, this paper does not limit its review to spatial and land use planning but accommodates various subfields of planning.

Planning in its varied forms and approaches can also support food security at national, local or household levels (Cabannes and Marocchino, 2018; Haysom, 2021; Slade et al., 2016). Many scholars suggest that food system planning is an emerging subfield in which planners consider food security issues (e.g. Brimblecombe et al., 2015; Soma and Wakefield, 2011; Vitiello and Brinkley, 2014). Food system planning is a relatively new concept within planning literature. It was introduced about two decades ago (Pothukuchi and Kaufman, 1999; Vitiello and Brinkley, 2014). However, according to Vitiello and Brinkley (2014), although not specified as food system planning, the integration of food considerations into planning has been practised for a long time. However, it is hidden under other

subfields of planning. For example, planning for food availability through agriculture has been a part of land use and regional planning.

Moreover, community development planning often includes considerations of food accessibility and justice. Transportation, logistics, and economic development planning also consider food distribution. Currently, many scholars theorise these food-centred considerations as “food system planning” (e.g. Brimblecombe et al., 2015; Soma and Wakefield, 2011). This brings food security to the focal point of planning and ties other subfields of planning. In section 4, the findings of this review of Indonesian literature on food security and planning will be linked back to the broader literature on food system planning.

3. Methods

The main objective of this literature review was to examine the nexus of planning and food security in Indonesia. To achieve this objective, we analyse: (1) How the literature about planning and food security in Indonesia defines and characterises food security; and (2) how different dimensions of food security are linked with planning in the literature on planning and food security in Indonesia.

This review draws from journal articles selected using the DOAJ (Directory of Open Access Journals) and SCOPUS databases. These online directories were used because they provide access to a wide range of high-quality peer-reviewed journal articles. This enables this review to examine scholarly publications reporting empirical and theoretical work on this topic.

The search sequence we used was: (“food security” AND “planning” AND “Indonesia”). The authors were helped by a research assistant with the article collection and selection process. We applied the search sequence to the title, abstract and keywords of the articles listed in the SCOPUS and DOAJ databases. We did not apply this search to the full text because we wanted to find articles in which food security and planning are the central focus. This search was conducted on 1 June 2022 and yielded 72 articles from DOAJ and 76 articles from SCOPUS. There were 145 articles left when duplicates were removed. The year of publication of the articles was not used as a selection criterion because the result of the literature search does not show any articles published before 2014. Therefore, we drew our literature review from journal articles published from 2014 to 2022.

As illustrated in Figure 1, the article selection procedure followed the scheme adapted from the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) by Moher et al. (2009). Firstly, these articles’ titles, abstracts and full texts were skimmed to select English-written journal articles. These selected articles focus on (1) food security issues in an Indonesian context and (2) themes relevant to planning, such as land use, governance, development, geography, spatial analysis, and environmental management. Studies on food security without a clear link to any planning were excluded. We also excluded articles on international relations, industrial engineering, marine and coastal science, gender study, business management, hydro-environment engineering, statistics and mathematical models, information

technology, agribusiness, poverty reduction, economics and energy. The final result of this selection process was 38 articles (Table 1).

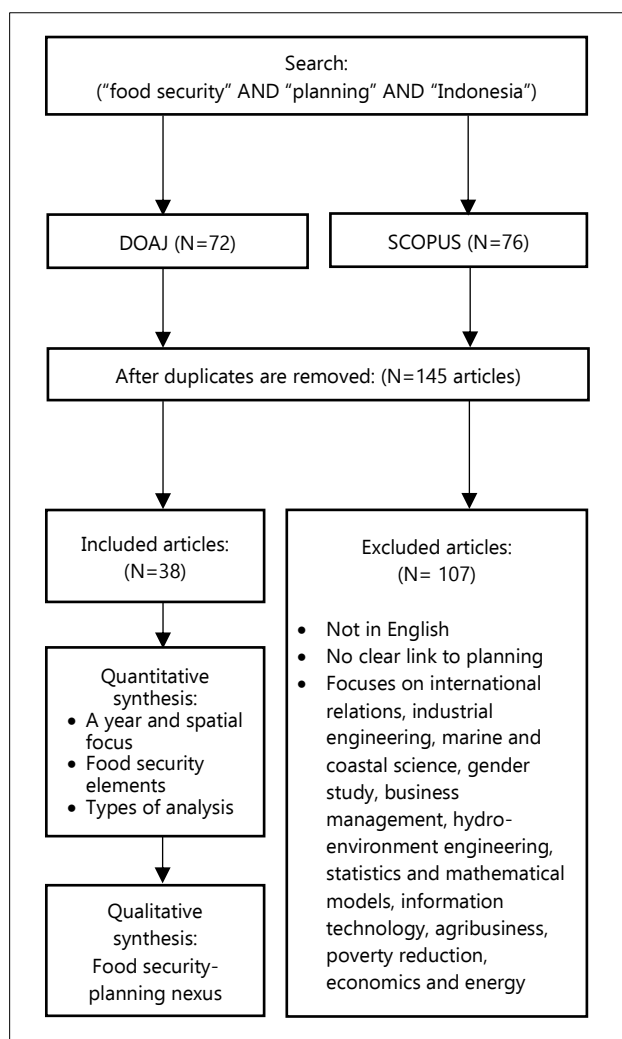


Figure 1. The article screening scheme followed in this review is adapted from Moher et al. (2009)

Following this article screening process, we examined the content of selected articles based on four aspects. First, we identified the year of publication and spatial focus of the study to see how food security and planning issues have developed from time to time in the existing literature and to find out the geographical pattern of the existing studies in this field. Examining the trend and geographical gap in the literature is important for formulating future research agendas. Second, we looked into what and how various dimensions of food security are discussed or analysed in the existing studies. We did this to identify which dimensions of food security have been the focus of existing research. This information can be used to inform planners which dimensions they need to focus on in the future. Third, we investigated the types of research design applied in the existing research. This provides information about the methodological gap that should be addressed in the next research agenda. Fourth, we identified how existing studies link food security with planning. This was done to show the nexus of food security and planning that emerged in Indonesian studies. This information is then contrasted with broader literature to reveal the theoretical

gap for further research.

Table 1. The list of papers included in this review

Author (year)	Geographical base
Virtriana et al., (2022)	West Java
Adam et al., (2022)	Indonesia
Ramadhani et al., (2021)	Kapuas, Central Kalimantan
Gultom et al., (2021)	Indonesia
Siskha et al., (2021)	Indonesia
Rosalia et al., (2021)	Bengawan Solo watershed
Kusumanagari and Ellisa (2021)	City of Malang
Maharani et al., (2021)	Labian, Kapuas Hulu, West Kalimantan
Hidayat et al., (2021)	Kaumrejo,, Malang Regency
Purwanto et al., (2021)	Karawang Regency
Aditama et al., (2021)	34 provinces
Putra et al., (2020)	Indonesia
Zamzami et al., (2020)	Pariaman Tengah, Pariaman
Santosa et al., (2020)	160 cities in Indonesia
Harini et al (2020)	Penimbun, Kebumen, Central Java
Satria et al., (2020)	Muna District, South Sulawesi
Kurnia et al., (2020)	Bekasi Regency
Purwanto et al., (2019)	Karawang Regency
Chandra and Diehl (2019)	Kalideres, Cengkareng, West Jakarta
Pradana et al., (2019)	Indonesia
Pertiwiningrum et al., (2019)	Jembatan Basah and Rukun Jaya, Bulu, East Seram
Wahyuningrat et al., (2019)	Indonesia
Abdurachman et al., (2019)	Brebes regency
Olivia et al., (2018)	41 major urban areas in Indonesia.
Yossyafra et al., (2018)	Tanah Datar, Limapuluh Kota, Padang, Pariaman (West Sumatra)
Rahayu et al., (2018)	Sarbagita Metropolitan, Bali
Pusponegoro et al., (2018)	Jenawi
Pertiwiningrum et al., (2018)	Manokwari and Merauke, Papua
Nuryadin et al., (2018)	Central Maluku District
Ridwan et al. (2017)	Tamansari, Cibeunying District, Bandung.
Palutturi et al. (2017)	North Kolaka, South Sulawesi
Yuniriyanti and Sudarwati (2017)	Malang district
Pribadi and Pauleit (2016)	The Jabodetabek Metropolitan Area
Noer (2016)	Indonesia and West Sumatra
Wise et al., (2016)	Nusa Tenggara Barat
Bohensky et al (2016)	Nusa Tenggara Barat
Mangubhai et al., (2015)	Raja Ampat, Papua
Widiatmaka et al., (2014)	West Lombok Regency

The synthesis of the food security-planning nexus was the focal point of this literature review. This was done by examining how the concepts of food security and planning are connected in each article. Nexus is a term from the sustainability field that shows the consolidation of different types of resources traditionally governed separately (Hoff, 2011; Sarkodie et al., 2019). The term nexus comes from the Latin word *nectere*, which means to bind, and it has been used in biology, philosophy and economics for a long time (Liu et al., 2018). Since 1983, this term has been applied in natural resource management to study interconnections between food and energy (Chang et al., 2020). Currently, nexus has been widely applied in research on food-water-

energy connections. The nexus lens enables integrated planning and governance of multiple sectors. This nexus approach is critical for identifying collaboration and compromises between two or more sectors (Liu et al., 2018; Proctor et al., 2021). Nexus is also frequently used to unveil the interplay among different entities within a system (Zhang et al., 2018). This paper adopts this concept of nexus to examine the interactions among different food security and planning dimensions discussed in the existing literature.

In identifying the fourth aspect (the food security-planning nexus), thematic analysis was applied to analyse the collected articles. Thematic analysis is a qualitative descriptive approach that involves identification, analysis and description of themes within qualitative data (Braun and Clarke, 2006). Different from content analysis, thematic analysis involves an iterative coding process. The journal articles were read and reread before the initial codes were generated. After which, these codes are collated into themes which are then reviewed and refined to ensure that they represent the entire data set and show the overall story. Themes self-emerged during this thematic analysis process.

4. Results and Discussions

4.1 Year of Publication and Spatial Focus

Our literature search results show that no English-written articles about planning and food security in Indonesia were published before 2014. The number of scientific publications in this field has been increasing mainly during the last five years (Figure 2). However, there have been relatively few studies in this field. During the last ten years, just 38 published English-written papers have been published in this field. The number of studies in this field is relatively small, maybe because food security and planning have not been explicitly connected in the existing literature. The integration of food security and planning may be “concealed” under various planning terms and concepts (Vitiello and Brinkley, 2014). Suppose more Indonesian scholars are concerned about this issue. The broader international literature on this field has been exponentially growing during the last decade (Moragues-Faus and Battersby, 2021; Raja et al., 2014).

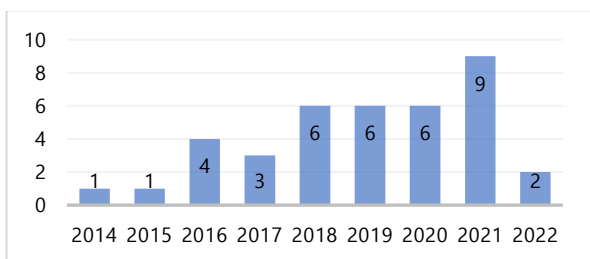


Figure 2. The number of papers by the year of publication

Planning professionals and scholars in developed nations were attentive to different dimensions of the food system during the early twentieth century, but throughout the mid-twentieth century, food has been neglected in the urban planning field (Vitiello and Brinkley, 2014). In the early 21st century, Pothukuchi and Kaufman (2000) brought

the food system back into planning discourse. Since then, the discussion on food system planning and other related topics have emerged in planning literature and been adapted in many planning works (e.g. Cabannes and Marocchino, 2018; Gottero, 2018; Marat-Mendes et al., 2021).

Compared with the international body of literature, Indonesian scholar participation in the discussion on food-planning integration is quite late. The literature search employed in this study shows that this field emerged in Indonesia no earlier than 2014. However, given that this literature review only included English-written scholarly published papers, there might be some grey literature or unpublished studies that already discuss food-planning connections. For better understanding, further study needs to accommodate these types of literature.

Regarding study location, 14 studies were conducted in Java, and 15 studies analysed different regions in other Indonesian islands (Bali, Kalimantan, Sumatera, Sulawesi, Maluku and Papua), illustrated in Figure 3 below. Additionally, there are two multi-region studies, one focuses on 41 major urban areas across Indonesia, and another includes 34 provinces of Indonesia. The rest of the studies analyse Indonesia in general. This finding shows a significant difference between the number of studies conducted in Java and regions outside Java. This indicates that food security/planning has not only been an issue for communities in less urbanised regions outside Java, but it has also been a matter of interest in Java, the most urbanised island in Indonesia. Indonesia consists of thousands of islands, but around 56 per cent of its population is concentrated on Java Island (BPS, 2021).

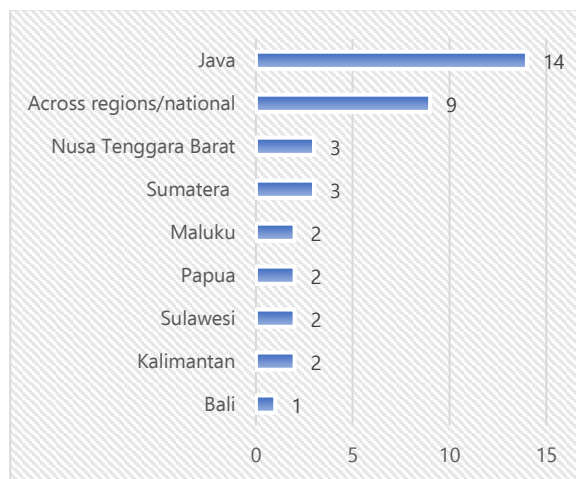


Figure 3. The number of studies by the region studied

The notion that food security is not only a rural issue anymore in Indonesia accords with the broader literature on food system planning. Responding to the drawbacks of distancing food systems from cities, many planning scholars highlight the significant role of planning in shaping urban food systems and contributing to urban food security (e.g. Marat-Mendes et al., 2021; Meenar et al., 2017; Steenkamp et al., 2021; Abel et al., 2022; Hamidi, 2020; Khadem et al., 2022). The current discourse on food security is not only limited to the issues around food availability and accessibility of the poor communities in

rural and remote areas but also covers discussion on urban and peri-urban agriculture (Chandra and Diehl, 2019; Pribadi and Pauleit, 2016), urban food deserts (Leete et al., 2012) and urban short food supply chain (Schmutz et al., 2018). These are various ways planners can rebuild the link between food systems and cities. Section 4.4 further discusses the existing Indonesian studies linking food security and planning.

4.2 The Use of Food Security Dimensions

This study used Steenkamp et al. (2021) framework of food security and the food system to examine what multiple dimensions of food security are accommodated in the existing studies. As illustrated in Table 2, the result indicates that food availability and production are the centre of interest for most studies (40 articles). Access and distribution are mentioned in 20 articles. At the same time, utilisation and consumption are incorporated in 17 studies. Only one study includes stability. The marketing dimension is also mentioned in one study. No studies analyse sustainability and agency as a dimension of food security.

Given that current studies merely focus on the supply side of the food system, future research in Indonesia needs to be more attentive to the other sides of the food system, especially its stability, sustainability, agency, marketing and post-harvest dimensions. Focusing on food production and availability is essential to ensure enough food for the population, but it may exacerbate the problems on the other side of the food system. For instance, the government promotes massive rice production across different Java regions solely based on food demand and availability calculation. When harvest season comes, the supply is abundant, creating lower prices. This benefits the consumers and intermediaries, but farmers face financial issues because the price is too low, so they cannot make a good profit. This illustration outlines the significance of understanding food security from other lenses, such as farmers' agencies.

Table 2. Food security and food systems dimensions and the number of papers in which these dimensions were used.

Dimensions	Number of articles
Availability	21
Production	19
Access	17
Utilisation	10
Consumption	7
Distribution	3
Stability	1
Marketing	1
Sustainability	0
Agency	0
Processing	0

Regarding commodities, 13 studies focused on rice because it has been considered the leading staple food in Indonesia. Only two studies focus on fruits. First, Santosa et al. (2020) analysed fruit trees' potential for enhancing food security and urban biodiversity by collecting data from 160 Indonesian cities. Second, Puspongoro et al. (2018) conducted a land suitability analysis to plan the locations for banana cultivation as a land conservation/food security strategy. Moreover, three other studies (Mangubhai et al.,

2015; Zamzami et al., 2020) discuss food security in fishery, and one is about livestock (Pertiwiningrum et al., 2019). The rest of the studies do not discuss specific food commodities; for example, Siskha et al. (2021) include fishery and agriculture in food security and planning. Some studies about urban agriculture, such as research by Chandra and Diehl (2019) and Ridwan et al. (2017), also do not focus on any specific types of food in conducting analysis. Biodiversity and food diversification are also highlighted in some studies (Putra et al., 2020; Ridwan et al., 2017; Santosa et al., 2020; Wise et al., 2016). This implies that these studies view food security as unrelated to a particular commodity. Food security should also be linked to the issues around ecological biodiversity and diversification of food sources.

4.3 Analytical Methods

The existing studies reviewed applied a wide range of analytical methods. As shown in Table 3, there is not much difference between one approach to another. Many studies employ quantitative approaches such as spatial or statistical analysis and system dynamic modelling. In addition, a relatively limited number of studies have applied qualitative approaches and mixed methods. This may be due to the variations in the geographical scope of these studies. As presented in Table 1, many studies focus on regional and national scales, and a few centre their analysis on a village, kampung or neighbourhood-level processes. Qualitative approaches are usually applicable for these scales, but quantitative approaches are needed for bigger scales.

Table 3. Types of analytical methods and the number of papers in which these methods were applied

Analysis methods	Number of articles
Spatial analysis and/or modelling	6
Descriptive analysis	5
Surveys	5
Statistical analysis	4
Case study	3
Mixed methods	3
Legal research	2
System dynamic modelling	2
Ethnographic analysis	1
Review/opinion	1
Policy analysis	1
Others	5

This finding suggests a need for further research exploring the food security and planning processes at community levels in Indonesia. Regional/national scale analysis is critical for supporting macro-scale policies but cannot explain the diversity and complexity of food security/planning issues at the grass-root levels. Further research exploring coping strategies and cultural values of diverse Indonesian communities across urban and rural settings is needed to enrich our food security and planning knowledge. Besides, understanding local and community processes are critical for designing effective and practical planning actions or solutions to complex food security problems (Meenar et al., 2017; Pothukuchi, 2004).

4.4 The Link Between Food Security and Planning

Interestingly, the food security-planning nexus has not only been discussed in the urban and regional planning literature. However, it has been implied in studies from other related disciplines, such as architecture, landscape architecture, civil and environmental engineering, environmental management, geography, public policy, public administration, law, agriculture, agronomy, economics and disaster resilience. This emphasises the need for food security and planning integration. Besides, this highlights that planning needs to collaborate with other disciplines in its efforts to support food security.

Table 4. Food security-planning nexus

Nexus nodes	Highlights
<i>Disaster mitigation/adaptation</i>	Food crises mitigation planning Planning for mitigating/adapting climate change impacts on agriculture Flood and drought mitigation/adaptation planning
<i>Policy and Governance</i>	Planning for managing the distribution of subsidised fertiliser Integrating food security indicators into planning strategies Accommodating food security and nutrition dimensions in Planning for healthy cities Planning to protect agricultural land Planning for managing agricultural activities and urban land expansion
<i>Resources and Infrastructure Management</i>	Commodity-based regional planning and development for improving food availability Planning for managing water-energy-food (WEF) sectors. Planning the irrigation systems Planning agricultural land expansion and/or intensification Planning for managing the resource in a marine protected area
<i>Economic Development</i>	Planning for an integrated agricultural tourism destination Planning as a tool for enhancing the rural/agricultural economy Planning to develop diverse food vendors to support the local farming business
<i>Social planning</i>	Accommodating cultural values/ local wisdom supporting food security in planning Integrating women's role in planning strategies for family food security
<i>Urban greening</i>	Planning for urban agriculture and backyard gardens Including fruit tree planting in urban greening strategies to promote urban food security and biodiversity.

There are various ways in which the studies reviewed connect food security issues with planning (Table 4), but they can be grouped into six broad themes. First, the studies suggest that food security-planning integration can be done through disaster mitigation and adaptation, such as planning for food crises mitigation (Riantini et al., 2021), climate change adaptation (Bohensky et al., 2016; Wise et al., 2016) and adaption to other natural hazards like flood

and drought (Rosalia et al., 2021; Hidayat et al., 2021). These risks affect food security, and planning can help reduce these risks through adaptation and mitigation planning.

Second, the food security-planning synergy can be achieved through planning policy and governance. Six studies discuss planning for agricultural land protection (Adam et al., 2022; Gultom et al., 2020; Kurnia et al., 2020; Purwanto et al., 2019; Wahyuningrat et al., 2019; Pertiwiningrum et al., 2018). Agricultural land protection policy in Indonesia is an avenue in which planning authorities should collaborate with other authorities and institutions which govern the development of agriculture in Indonesia. Moreover, four studies mention that planning can contribute to food security by managing agricultural activities and urban land expansion (Ramadhani et al., 2021; Putra et al., 2020; Olivia et al., 2018; Yossyafra et al., 2018). In addition, Adam et al. (2022) suggest that planning policy can help manage the distribution of subsidised inputs like fertiliser to ensure that it is distributed equally across regions and communities. Food security considerations also should be integrated into planning strategies (Pertiwiningrum et al., 2019). For instance, Palutturi et al. (2017) accommodate food security aspects in the framework of their healthy city project.

Third, the connection between food security and planning is represented in managing different agricultural resources and infrastructure. Planning can reinforce food security through regional planning and development, which support local commodities in each sub-region (Harini et al., 2020; Puspongoro et al., 2018). For supporting food security, planning can also accommodate integrated management of water-energy-food (Purwanto et al., 2021). Furthermore, planning for irrigation systems (Abdurachman et al., 2019), expansion and intensification of agricultural land (Nuryadin et al., 2018; Widiatmaka et al., 2014) and marine resources management (Mangubhai et al., 2015) can also support food security in terms of food production and availability.

Fourth, economic development can bridge food security and planning. This can be done through agricultural tourism planning (Rahayu et al., 2018) and improvement of the rural agricultural economy and local farming businesses (Maharani et al., 2021; Satria et al., 2020; Pradana et al., 2019; Pertiwiningrum et al., 2019; Pribadi and Pauleit, 2016; Putra et al., 2020). By improving the local economy, planning can support the food affordability of local communities. Moreover, developing agritourism activities can enhance the agricultural economy and its competitiveness. In the long term, this can help farming communities to sustain local food production.

Fifth, under the umbrella of social planning, planners can support food security by taking cultural values and women's roles into a community and regional food planning strategies. The food security-planning nexus can be an accommodation of traditional wisdom and culture of local communities that may enhance food security in planning strategies (Zamzami et al., 2020; Yuniriyanti and Sudarwati, 2017). The integration of women's role in planning is also critical, especially for improving food security at household levels (Yuniriyanti and Sudarwati,

2017).

Sixth, urban greening strategies can be an arena for bringing food-growing activities back to the cities. This can be done by accommodating urban agriculture, community gardens and backyard farming in the land use planning strategies (Kusumanagari and Ellisa, 2021; Purwanto et al., 2019; Chandra and Diehl, 2019; Pertiwiningrum et al., 2018; Ridwan et al., 2017). Growing fruit trees in cities can also promote urban food security while providing urban greening and improving urban biodiversity (Santosa et al., 2020).

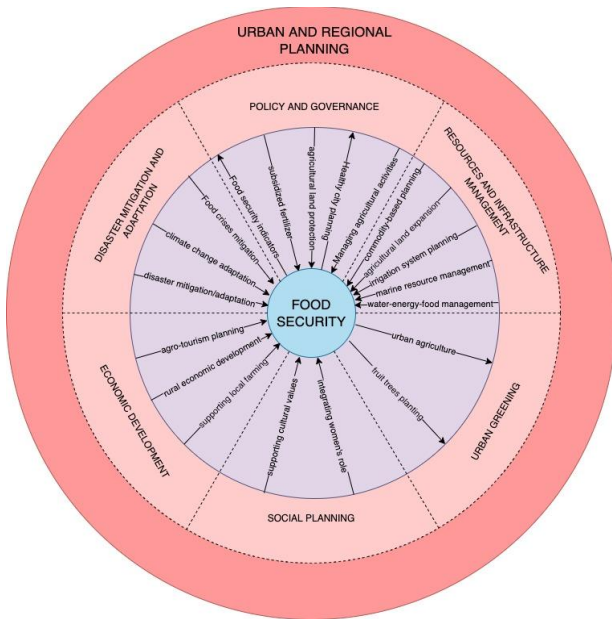


Figure 4. The planning-food security nexus synthesised from the literature

Based on these findings, there are many ways in which different forms of planning can improve and foster food security in urban and rural communities. Among the twenty nexus nodes identified, only four nodes show the influence of food security dimensions on planning (Figure 4). For example, food security consideration modifies urban greening strategies, which traditionally do not include urban agriculture and fruit tree planting. Another example is the inclusion of food security indicators in healthy city strategies and other planning strategies in general. The majority of nodes represent how “traditional” planning practices can be used to address food security issues.

Moreover, the food security-planning nexus identified in this review merely represents the “synergy”, and there have been limited examples of “trade-off” between food security sectors and planning discussed in the existing literature. A question remains regarding how food security considerations shape contemporary urban design and planning practices in Indonesia and what kind of trade-off is embedded in them. Further investigation into these issues is needed to understand better the nuance of the food security-planning nexus in Indonesia.

Hence, the themes and nodes that emerged in this synthesis of the food security-planning nexus provide a conceptual framework illustrating the food security-planning nexus in Indonesia. This framework will be tested

through expert interviews with Indonesian planning professionals and scholars in subsequent research following this literature review.

5. Conclusion

This review focuses on examining four aspects of the literature. First, in terms of the time of publication, the findings show that the scholarly literature noting the nexus between food security and planning has grown in Indonesia since the early 2010s. However, the aggregate number of studies in this field depicts that the food security-planning nexus has not been a popular topic in Indonesia. This study finds 38 Indonesian studies linking food security and planning. This may be because the food-planning nexus has been “concealed” under other planning terms (Vitiello and Brinkley, 2014). Therefore, an extended discussion on how planning “implicitly” encompasses food security issues and how the notion of food planning has been developed throughout the planning history in Indonesia are essential to enhance current knowledge of planning history and theory. As such, future research should thoroughly examine the history of food system planning in Indonesia. In terms of location, about half of the existing studies were conducted in Java. This shows that more studies are needed to explore the food-planning nexus in another Indonesian region. Besides, further research involving expert interviews with planners and/or planning academics is needed to capture their aspirations and their non-scholarly or unpublished projects on food security and planning.

Second, the findings on the dimensions of food security depict that the existing studies merely focus on food availability and production. Further work needs to be more attentive to other dimensions of food security and the food system, especially the distribution, stability, marketing, sustainability, agency and food processing. Given that Indonesia is a large archipelagic state, it is interesting to explore how planning can support food distribution and access within and between Indonesian islands. Contemporary issues related to food distribution and access, such as “food miles”, “food desert”, and the emergence of “ghost kitchen” or “cloud kitchen” in Indonesian cities and regions, also need to be explored. Further research on agroecology and resilient food systems is also critical to be done in this era of climate change and uncertainty. Additionally, there are opportunities to link a smart city or smart village planning with various food issues.

Third, in terms of the research design applied, there has been a relatively limited number of qualitative research. Given the diversity of local Indonesian contexts, more qualitative studies are needed to explore and highlight how food security and planning collide within a diverse Indonesian society. Moreover, exploratory and phenomenology research is particularly important to unveil the lived experiences of actors involved in the planning process or actors within the food system whose behaviours and decisions affect the spatial arrangement of cities/regions. The insights from qualitative research are also beneficial to complement the findings from large-scale quantitative research and spatial analysis.

Lastly, this literature review reveals six themes in which food security and planning are connected: 1) Disaster mitigation and adaptation; 2) Policy and governance; 3) Resource and infrastructure management; 4) Urban development; 5) Social planning; and 6) Urban greening. However, these themes merely unveil the synergies between food security and planning. Further research needs to examine how food security considerations modify contemporary urban design and planning practices in Indonesia and the “trade-offs” involved. This is critical to understand better the compromises required in integrating food security into planning and vice versa. This is critical to comprehend the problems and challenges for food security and planning integration. Indonesian research in this field also needs to explore the social dimensions of the nexus, especially issues related to the cultural values of diverse Indonesian communities that support food security. In terms of policy and practices, singly addressing food security and planning problems may overlook their nexus. Therefore, researchers and policymakers should better understand this food security-planning nexus because it can facilitate collaboration among authorities and institutions governing food security and planning.

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