ISSN XXXX-XXXX

# COHERENCE BETWEEN URBAN FARMI PROGRAMME AND ADIWIYATA SCHOOL PROGRAMME: INTEGRATING FOOD SECURITY POLICY IN SUSTAINABLE HUMAN RESOURCE DEVELOPMENT

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**Abstrak**

The link between food security and sustainable resource development is a strategic component of the national development agenda. Urban agriculture has been embraced as an innovative solution to the challenge of limited agricultural land in urban areas, serving as a significant step towards achieving sustainable resource development through contextualized learning. The Adiwiyata School Programme, a policy of the Ministry of Environment, can be seen as part of the Sustainable Human Resource Development structure at the primary and secondary education levels, where environmental values and awareness are integrated. These include character and social responsibility, independence and life skills, creativity and innovation, and recognition of the importance of sustainable food security. However, the implementation of these two policies at the local level reveals a variety of approaches influenced by local government commitment, institutional capacity, and cross-sector coordination. This research aims to analyze the coherence of the urban agriculture policy with the Adiwiyata school program and identify challenges faced by local governments in integrating the two policies. A qualitative approach, utilizing the literature study method, was chosen as the data collection technique, which was then analyzed using the Policy Coherence Framework. Based on this platform, we will examine the level of alignment between different policies to enable synergy in their implementation. The research findings are expected to provide insights and support for the achievement of policy objectives, especially through coherent synergies between policies, as well as offer recommendations for policy formulation at the local level to enhance food security and sustainable human capital development.

Keywords: Policy coherence framework, urban agriculture, Adiwiyata School Programme, food security, Sustainable Human Resources

## INTRODUCTION

Policy coherence involves synergy between different policies to achieve a common goal by ensuring there is no conflict between them (Careja, 2011; Fopa Tchinda & Talbot, 2024; Orozco Giraldo & Cachopo, 2024). Policy synergy is done by integrating several

government programmes. For example, urban farming synergised with the adiwiyata school programme can be an example of an alternative model of food security policy synergy and sustainable human resource development to anticipate land conversion problems and low public interest in the agricultural sector. This situation is an effective solution in governance, especially in the corridor of sustainable development by applying a pattern of cooperation (Brand et al., 2021).

Indonesia is one of 154 countries committed to supporting the realisation of the Sustainable Development Goals (SDGs), where food security and human resource development (HRD) are part of the international agreement. The policy is a form of implementation of the second and fourth of the seventeen SDG goals that are scheduled to be realised by 2030. The second goal leads to the elimination of hunger and improved nutrition. While the fourth goal points to the importance of quality education and lifelong learning. The coherence of the two is quite close, where access to adequate food and nutrition will support the cognitive and physical development of individuals, and lead to increased human resource capacity. The capacity of human resources who are technically qualified and adaptive to technological developments will make a significant contribution to realising food security (Kurdi et al., 2023).

Food security policy is a development priority and the government's effort to meet domestic food needs. The policy covers availability, accessibility, affordability and stability of food supply. Food availability includes both quantity and quality. In terms of quantity, food must be able to fulfil the increasing demand due to population growth. In addition, the quality and diversity of food types must fulfil the dynamics of preferences influenced by increased public understanding of the importance of nutritional balance. Furthermore, accessibility and affordability involve aspects of food distribution that emphasise timeliness and targeting so that all levels of society are ensured to be able to reach it easily (Zamrodah, 2020).

However, as time progresses, the government encounters increasingly intricate challenges. This is particularly due to the emergence of policies that are inherently dilemmatic. For instance, this pertains to the transformation of agricultural land into non-agricultural zones, which is often driven by population shifts (Yogi et al., 2021). On one hand, the policy for land conversion aims to address the evolving spatial requirements resulting from urbanization. Nevertheless, this action also jeopardizes the stability of food

security, as the reduction in agricultural land adversely affects food crop production. Additional challenges arise from the diminishing public interest in the agricultural sector, the aging rural population predominantly composed of the elderly, and the sluggish advancement of agricultural technology in comparison to other sectors (Chudriana Putri et al., 2024).

Urban agriculture, commonly referred to as urban farming, necessitates a combination of skills, expertise, and innovation (Adetya, 2024). These practices have played a crucial role in achieving food security and fostering human resource development. A prior investigation conducted by Asiah et al. (2023) in Sampangan Urban Village, Semarang City, revealed that the execution of urban farming initiatives was a proactive measure against local food insecurity. Furthermore, the initiative, which is part of the "Ayo Nandur" program, aids in enhancing human resource capacity, particularly in terms of agricultural techniques and skills. According to Pradhan et al. (2024) in the journal Cell Reports Sustainability (2024), the urban agricultural movement also promotes the enhancement of nutritional literacy among both school students and the wider community.

The commitment of local government, the capacity of institutions, and coordination across sectors are crucial for achieving independent food fulfillment (Adetya, 2024). This conclusion emerged from a prior investigation into the urban farming initiative launched by the Food Security and Agriculture Office of Surabaya City, aimed at addressing food requirements in the aftermath of the pandemic. The findings indicate a strong interest among the Surabaya community in agricultural-based economic development initiatives within urban settings. This interest serves as an indicator of the local government's effectiveness in advocating for and educating the public about the advancement of urban farming in their region (Wardah & Niswah, 2021).

The collaboration between the urban farming programme and the Adiwiyata School programme, as examined in a study by Hidayah & Baedowi (2020), is evident in the implementation of aquaculture and horticultural practices that utilize each student's yard as a component of the environmental education (EE) curriculum at SMAN 3 Klaten, located in Central Java Province. Environmental Education, which encompasses a series of initiatives institutionalized by the Ministry of Environment since 2006, aims to instill conservation values at both primary and secondary education levels. The incorporation of the urban farming programme into the educational curriculum yields beneficial effects for both the school and the surrounding community. Firstly, schools serve not only as formal educational

institutions that impart knowledge about the significance of food security from a young age but also as practical laboratories where sustainable agriculture, environmental conservation, and community empowerment are actively practiced. Secondly, the urban farming initiatives established within schools can contribute to community food reserves. Lastly, the early introduction and familiarization with urban farming are anticipated to foster a greater interest and enhance skills in the agricultural domain.

The urban farming initiative and the Adiwiyata School Programme possess the capacity to create mutually beneficial policy synergies; however, they currently operate independently. This situation arises from insufficient coordination among various sectors. The issue addressed in this research pertains to the coherence of programmes within the framework of local government, which is hindered by policy fragmentation, restricted institutional capacity, and inadequate inter-agency coordination. The rationale for selecting this research topic is grounded in the pressing need for sustainable development transformation through the alignment of cross-sector policies to enhance the attainment of shared objectives.

The research questions are articulated as follows: (a) How is the coherence between the urban farming policy and the Adiwiyata School Programme?; (b) Does the integration of the urban farming programme and the adiwiyata school programme have an impact on the effectiveness of the implementation of sustainable human resource development policies?; (c) What challenges and barriers do local governments encounter in merging the two policies?

This study aims to: (a) Examine the alignment of policies between urban farming and the Adiwiyata School Programme utilizing the policy coherence framework; (b) Evaluate the effectiveness of food security policy execution within the region; (c) Identify the challenges in policy implementation that local governments face. The anticipated advantages of this research include: (a) Offering a thorough analysis concerning policy coherence in the public sector; and (b) Delivering recommendations and insights to inform the development of integrative and effective public policies at the local level.

## METHODOLOGY

This research uses a descriptive qualitative approach with a library research method as the main source of data. The focus of the study was directed at analysing the policy coherence between the urban farming programme and the Adiwiyata School Programme in

the context of food security and sustainable human resource development. Data sources were obtained through searching academic articles from Google Scholar using a structured search string: ("urban farming" OR "urban agriculture" OR "city farming" OR "vertical farming") AND ("Adiwiyata" OR "school program" OR "environmental education" OR "sustainability education") AND ("sustainability" OR "eco-friendly" OR "green practices" OR "environmental awareness") AND ("community engagement" OR "participation" OR "involvement" OR "collaboration") AND ("education" OR "learning" OR "curriculum" OR "training").

From the initial search results of around 3,600 documents, a screening process was carried out to exclude non-article document types such as proceedings, literature reviews, and non-empirical articles. After selection based on document type, 272 articles were obtained. A further selection was made and finally 50 articles published between 2019 and 2025 were selected, to ensure the currency and relevance of the data to the dynamics of urban farming policy and environmental education.

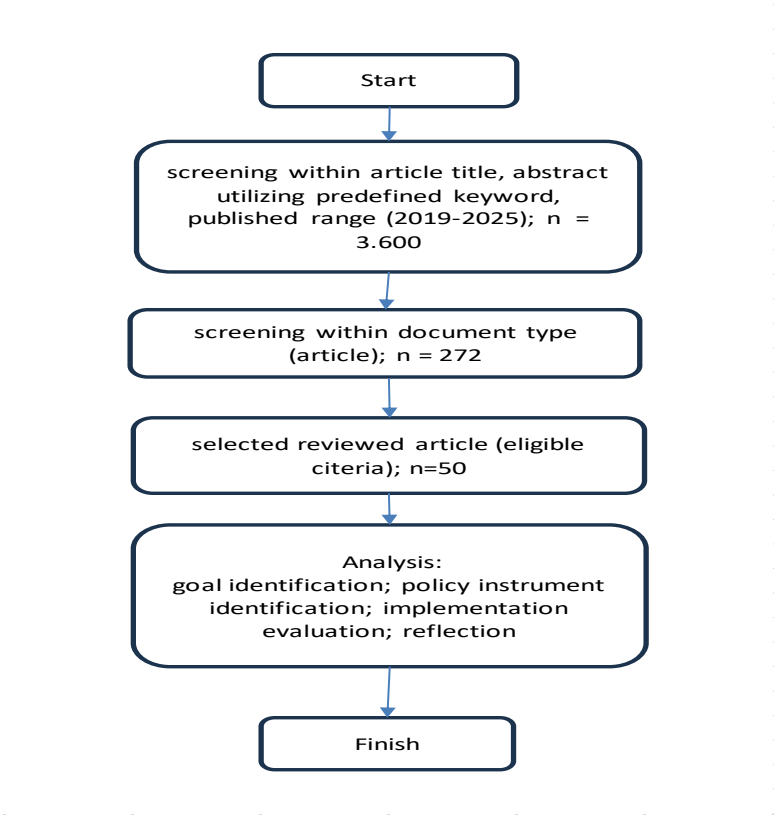


**Figure 1**. Library Research Method
*Source : Author's Illustration Based on PRISMA*

To analyse policy coherence, this research uses a policy coherence framework consisting of four main stages: (1) Objective Identification, which is an in-depth review of the formal objectives of each policy/programme, both urban farming and the Adiwiyata School Programme, based on regulatory documents, policy reports, and related academic literature; (2) Policy Instrument Identification, which includes a review of laws and regulations, regional policies, and other technical instruments underlying the implementation of the two programmes; (3) Implementation Evaluation, which is conducted by assessing cross-sector interactions and synergy or trade-off effects that arise during policy implementation. This evaluation is the basis for formulating recommendations for a more coherent policy design; and (4) Reflection, which is a future-oriented assessment stage focused on the need to adjust policy priorities to be more integrated, sustainable, and adaptive to social and ecological changes (Neog & Chaturvedi, 2022).

The analysis is also complemented by the identification of challenges and obstacles to policy implementation from the local government side, especially in the aspects of institutional coordination, limited resources, institutional cultural resistance, and low public participation. Supporting data for the analysis of challenges is obtained from the elaboration of the contents of selected articles and categorised thematically. With this methodological combination, the research is expected to provide a comprehensive and in-depth picture of the integration of urban farming policies and the Adiwiyata School Programme in the framework of strengthening food security and sustainable human resource development.

## RESULTS AND DISCUSSION

The results of this study reveal important findings related to policy coherence and integration between the urban farming programme and the Adiwiyata School Programme, as well as various factors that influence the effectiveness of sustainable human resource development policy implementation. Based on the review of 50 scientific articles that have been selected through a systematic process, this research produces a comprehensive analysis of the coherence of objectives, policy instruments, implementation in the field, implementation challenges, and general policy implications. In this chapter, these results are discussed systematically with reference to the policy coherence framework used.

## 1. Goal Coherence between Urban Farming and the Adiwiyata School Programme

Analysis of policy documents and academic literature shows that there is substantive overlap between the objectives of the urban farming programme and the Adiwiyata School Programme. Both aim to achieve environmental sustainability and community empowerment. Urban farming, as part of an urban food security strategy, aims to increase food self-sufficiency through the utilisation of limited space in urban areas. In addition, the practice of urban farming also strengthens social values such as mutual cooperation, environmental education, and carbon footprint reduction. Meanwhile, the Adiwiyata School Programme is an education-based approach that integrates the principles of environmental conservation into policies, curriculum, school activities, and infrastructure management. The main goal is to create an environmentally friendly school culture and educate students to become agents of change in realising sustainability at the community level. The coherence of policy objectives has implications for the potential formation of an active, practice-based learning ecosystem, so that students simultaneously gain knowledge from theory and at the same time apply it through direct practice.

The concept of urban farming can function as a living laboratory for Adiwiyata schools, while the educational approach of Adiwiyata can strengthen the critical awareness dimension of urban farming practices. This is in line with the idea of education for sustainable development (ESD), which emphasises the importance of hands-on experience in building sustainability understanding and behaviour, with the aim of equipping learners with the knowledge, skills, attitudes and values needed to shape a sustainable future (Jakob, 2020).

Environmental education through urban farming programmes can strengthen participation and build social solidarity among communities (Vieira & Panagopoulos, 2024). In addition, environmental education integrated with urban farming programmes will improve social skills, ecological knowledge, and awareness of the importance of nutrition for students' health (Xu et al., 2025).

## 2. Alignment of Policy Instruments

Policy instruments are an important component of assessing the coherence between two public policies. The implementation of urban farming in Indonesia is generally attached to policies related to food security. Some regions already have initiatives that are formally

outlined in the form of regional regulations or regional head regulations. One of them is the DKI Jakarta Governor Regulation No. 61/2018 on Urban Agriculture Development, which is one of the concrete initiatives.

Meanwhile, the Adiwiyata School Programme policy is nationally regulated through the Minister of Environment and Forestry Regulation (Permen LHK) No. P.52/MENLHK/SETJEN/KUM.1/9/2019 on Environmental Care and Culture Movement in Schools (GPBLHS). This regulation is the formal basis for the implementation of the Adiwiyata School Programme from local to national levels, covering aspects of curriculum, school management, and community involvement.

Instrument coherence occurs when urban farming and Adiwiyata policies are integrated in regional policies that have cross-sector platforms. However, findings from the literature review show that the synergy between the two is very limited. Not all local governments have explicitly linked the Adiwiyata programme with urban farming. This is an indicator of the need for policy harmonisation starting from the planning and budgeting stages so that the two are not fragmented (silo).

The role of local governments is needed to bridge the gap between food security policies and environmental education policies as a sustainable solution to food insecurity in rapidly urbanising areas (Mañego et al., 2024). The integration of the two needs to be encouraged through community and stakeholder participation, prioritising financial support to ensure programme sustainability, and developing teacher competencies linked to school garden management skills (Nalumu et al., 2021).

**3. Implementation Evaluation: Synergies and Trade-offs**

The execution of policy can serve as a factor influencing the effectiveness of the integration between urban agriculture and the Adiwiyata School Programme. An evaluation of various literature pertinent to this study reveals a pattern of synergy, although it has not yet been optimally organized.

**Table 1**. Synergy between Urban Farming Policy and Adiwiyata School Programme

| No | Evaluation Elements | Policy Synergy |
|---|---|---|
| 1. | Common Purpose | Urban farming and the Adiwiyata school program aim to ensure ecological sustainability applied to agricultural practices in urban areas, and environmental education (Nalumu et al., 2021; Vieira & Panagopoulos, 2024). |
| 2. | Connectivity | Urban farming and Adiwiyata school programs are interconnected through the participation of parents, NGOs, and local communities, |

| | | |
|---|---|---|
| | | thereby strengthening social engagement and loyalty to program implementation (Otieno & Namiripo, 2019; Tompkins et al., 2020). |
| 3. | Integration in the Context of Learning | Synergy can be seen through the integration of urban farming programs into the educational curriculum as part of ecoliteracy, thus further strengthening the implementation of the Adiwiyata school program which is a form of practice-based learning or real action (Gulhan, 2023; Nalumu et al., 2021). |
| 4. | Integration in the context of Strengthening Local Food Security | Urban farming and environmental education are able to transform food production and consumption to ensure a better quality of life (Nagib & Nakamura, 2020). |

Source: Compiled by Authors from(Gulhan, 2023; Nagib & Nakamura, 2020; Nalumu et al., 2021; Otieno & Namiripo, 2019; Tompkins et al., 2020; Vieira & Panagopoulos, 2024).

The synergy of urban farming policies and the adiwiyata school program is reviewed from the perspective of objectives, both to ensure the sustainability of environmental sustainability applied to agricultural practices in urban areas and environmental education (Nalumu et al., 2021; Vieira & Panagopoulos, 2024). Some countries, such as Brazil and Nigeria, have implemented agroecology-based agriculture to synergize the functions of food production and education within the framework of environmental sustainability (Jafar et al., 2025; Nagib & Nakamura, 2020). Meanwhile, Canada and several countries in the northern hemisphere are implementing urban agriculture based on green politics policies that focus on the environmental movement (Gray et al., 2020; Misra, 2023).

Urban farming and adiwiyata school programs are linked because parents, local communities, and NGOs are all involved (Otieno & Namiripo, 2019; Tompkins et al., 2020). People who are actively involved in their community are more likely to care about the success of a program and feel like they belong (Tompkins et al., 2020). Community-supported agriculture (CSA) in China is a way for people to work together to connect with each other and protect the environment, food security, and sustainable agricultural development (Tang et al., 2019).

The integration of urban farming and adiwiyata school programs in the context of learning can be seen in the implementation of a practice-based learning curriculum. Garden-based learning is a form of curriculum that comprehensively provides opportunities for students to learn important concepts and skills holistically with a STEM approach. Science, technology, environment, and mathematics (STEM) as an approach to the learning process in its application requires support for teacher capacity building, as well as collaboration with school stakeholders (Gulhan, 2023; Nalumu et al., 2021).

Urban farming practices and environmental education transform food production and consumption to ensure a better quality of life through the production of horticultural

crops from school gardens, as well as the utilisation of wetlands. Furthermore, urban farming is a key element of a strong and resilient food system (Kuhn et al., 2024). In addition to addressing food insecurity, school gardens also enhance students' understanding and development of insights into the importance of sustainable food security systems (Mañego et al., 2024; Nagib & Nakamura, 2020).

Table 2 shows the trade-off elements in the implementation of the urban farming policy and the adiwiyata school programme. The first is limited land and infrastructure (Jafar et al., 2025; Xu et al., 2025). Second, institutional fragmentation including coordination mechanisms between policy implementers, both formally and informally (Melchior & Newig, 2021). Third, trade-offs related to the capacity of human resources as policy implementers (Nalumu et al., 2021; Xu et al., 2025). The fourth is the curriculum pressure that is focussed on academic evaluation, leaving less room for the implementation of practice-based learning systems such as adiwiyata schools (Gray et al., 2020). Finally, technology and funding gaps regarding the mastery and innovation of agricultural systems on limited land (Garcia et al., 2023; Naresh et al., 2024).

**Table 2.** Trade-offs of Urban Farming Policy and Adiwiyata School Program

| No | Evaluation Elements | Policy Trade-offs |
|---|---|---|
| 1. | Limited Land and Infrastructure | The implementation of urban farming requires the availability of space or land, as well as other supporting facilities, while not all schools, especially those located in big cities, have the land area and facilities that meet the requirements for implementing urban farming (Jafar et al., 2025; Xu et al., 2025). |
| 2. | Institutional Fragmentation | The actors (implementors) of the urban farming policy are the Ministry of Agriculture and regional agencies assigned the main tasks and functions of food security, while the adiwiyata actors are the Ministry of Environment, Ministry of Education, and regional agencies assigned the main tasks and functions of education. In practice, there is no formal and integrated coordination mechanism (Melchior & Newig, 2021). |
| 3. | HR Capacity | Agricultural technicians are not equipped with techniques to teach children, while teachers lack crop cultivation skills and other expertise required for professional school garden management (Nalumu et al., 2021; Xu et al., 2025). |
| 4. | Curriculum Pressure & Academic Evaluation | Curriculum policies in some countries emphasise academic evaluation, leaving less room for practice-based learning systems such as Adiwiyata Schools (Gray et al., 2020). |
| 5. | Technology & Funding Gaps | Agricultural cultivation technologies and innovations on limited land such as verticulture are generally costly, while schools in developing countries are generally not well versed in such |

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|---|---|
| | technologies and are not given adequate budgetary support or facilities (Garcia et al., 2023; Naresh et al., 2024). |

Source: Compiled by Authors from(Garcia et al., 2023; Jafar et al., 2025; Melchior & Newig, 2021; Nalumu et al., 2021; Naresh et al., 2024; Xu et al., 2025).

Land availability is an important aspect of the urban farming programme, but not all schools have enough land, which weakens the implementation of the programme. Land scarcity is partly due to rapid urbanisation (Jafar et al., 2025). Another effect of growing urbanisation is the deterioration of environmental quality due to congestion, pollution, and excessive resource consumption. Declining environmental quality has the potential to hinder the success of food production, which is the goal of urban farming (Gray et al., 2020).

Policy coherence trade-offs often run into administrative and technical issues. Different focuses between programmes can undermine each other. The Adiwiyata school programme, although long-established, has not succeeded in integrating urban farming concepts into the learning curriculum in schools (Nalumu et al., 2021), leading to concerns that the learning curriculum is no longer adequate to combat pressing climate and food insecurity challenges (Schiano-Phan et al., 2022). The fragmentation of urban farming and adiwiyata school governance is influenced by the quality and coordination mechanisms between policy actors at various levels (Melchior & Newig, 2021). On the one hand, the Adiwiyata school programme focuses on waste management and the school environment. On the other hand, the Adiwiyata school programme focuses on waste management and the school environment, while knowledge and skills related to urban farming are often not integrated into the learning curriculum. Cross-sector coordination is not sustainable, further weakening the integration of food security policies in educational institutions. In fact, if the two are synergised, they can become a transdisciplinary vehicle to enrich the teaching methods of biology, mathematics, economics, and life skills.

The readiness of policy implementers can strengthen the success of urban farming programmes and adiwiyata schools. However, the reality is often not in line with policy expectations. Both agricultural technicians and school teachers are often not equipped with professional development to support policy synergy (Nalumu et al., 2021). Dedication to the programme is an element of the policy trade-off. The integration of urban farming into an adiwiyata school programme is labour-intensive and complex, which can be a workload for subject teachers as it exceeds the teaching hours that are the main job of teachers (Xu et al., 2025).

Educational curriculum policies in some countries are more emphasised on academic evaluation, making less room for practice-based learning systems (Gray et al., 2020). Moreover, curricular materials in the Adiwiyata programme do not receive the attention they deserve. In addition, the material presented is also not aligned with academic standards. The lack of assistance in applying urban farming techniques means that neither teachers nor students have sufficient knowledge and skills to implement the programme (Xu et al., 2025). The limited innovation and technology mastered, as well as the funding ability of the school further weakens the synergy between urban farming policies and Adiwiyata schools (Garcia et al., 2023; Naresh et al., 2024).

**4. Reflection and Continuation of Policy Cycle**

Reflection in the context of policy coherence means evaluating the achievement of strategic objectives and preparing a more adaptive policy reformulation. The study findings show that without a coherent framework involving cross-sectors, both policies (urban farming and Adiwiyata) will only be symbolic programmes. The following reflections focus on the need to adjust future policy priorities to be more integrated, sustainable, and adaptive to social and ecological changes:

a. Resource-based innovation

   Innovation by utilising resources as optimally as possible is a smart step that needs to be encouraged in every educational unit. Some cultivation techniques such as aquaponics and verticulture may be an alternative to overcome the shortage of land. Aquaponics is a technique of combining hydroponic systems with aquaculture that has been recognised as sustainable, environmentally friendly, and has high functionality and productivity. The application of such systems in urban farming programmes in schools has the potential to improve food security (Nair et al., 2025).

b. Policy reformulation and cross-sector collaboration

   Policy reformulation and collaborative governance are solutions to strengthen the achievement of policy objectives, while overcoming fragmentation in programme implementation (Bodini, 2024). Institutional collaboration and strengthening cross-sectoral coordination can improve implementers' common perception of coherent policy principles (Mensah et al., 2021). Furthermore, knowledge exchange and synergies are needed to encourage larger-scale

adoption of programmes as part of the transition to sustainable food security (Boix-Fayos & Vente, 2023).

c. Integration of urban farming materials into the learning curriculum

The learning experience gained by students in adiwiyata activities includes interdisciplinary subjects that are a vehicle for realising the theory in the classroom into real experience through practical skills. The linkage of urban farming materials into the school learning curriculum (mathematics, science) is still suboptimal due to the lack of insight and experience of subject teachers (Xu et al., 2025).

d. Integrated programme assistance

The gap in teachers' capacity to master agricultural technology can be addressed with assistance from agricultural technical personnel from government agencies and external organisations. However, the government's ability to provide guidance to schools is often limited, so collaboration with external agencies and individual volunteers is required (Xu et al., 2025). Programme assistance by involving relevant agencies and stakeholders through technical skills training and appropriate technologies globally supports wider implementation (Naresh et al., 2024). Assistance also includes providing programme support for the procurement of materials and equipment needed to implement urban farming in the school environment, for example: seeds, fertilisers, agricultural tools (rakes, hoes, sickles, pruning shears), vegetable beds, storage sheds, composting facilities, and advanced garden maintenance (Xu et al., 2025).

The policy reflection emphasised the need to revise the regional policy framework so that the integration of Adiwiyata and urban farming is not just a temporary project, but becomes part of the long-term regional development agenda. Planning and budgeting mechanisms are needed that make environmental-based activities a priority for education and local food development.

Urban farming is a strategic effort towards sustainable agriculture, so the next policy stage requires more progressive macro policies to support the realisation of strengthening regulations and institutional mechanisms that are increasingly integrated (Melchior & Newig, 2021). The concrete strategies include forming a cross-sector task force involving various agencies (education, environment, food security, and development planning) at the

city/district level; designing programme success parameters by integrating Adiwiyata and urban farming achievement indicators; and developing a master plan for the development of Adiwiyata schools based on local food security.

**5. Identification of Challenges and Barriers**

The challenges and barriers that are often found in integrating urban farming programmes and Adiwiyata schools at the local level can be mapped as follows:

a. Resource Aspect

School resources, including the ability to budget for activities, the readiness of resources (teachers, education personnel, students), and supporting facilities often do not support the integration of urban farming into the Adiwiyata school programme. School garden projects are highly dependent on teacher initiative and dedication, or rely on assistance from third parties whose quantity and duration cannot be ensured. The capacity of teachers and agricultural technicians is also limited. On the one hand, teachers in schools generally do not have technical training on urban agriculture. On the other hand, agricultural service officers are not accustomed to assisting learning activities in schools (Xu et al., 2025).

b. Communication Aspect

Cross-sectoral coordination mechanisms are lacking and difficult to establish between agencies, resulting in a sense of acting individually in programme implementation. The lack of cross-sectoral coordination means that problems and limited resources cannot be anticipated optimally, leading to a lack of knowledge and community involvement in programme implementation, and potentially leading to institutional resistance. The low involvement of communities and parents requires anticipation through the establishment of inclusive and sustainable participatory mechanisms as part of the socio-technical regime to align with the development of agricultural systems that evolve along with the structure of society (Melchior & Newig, 2021). Institutional resistance, such as principals and teachers viewing gardening activities as an additional burden rather than part of their main duties, indicates the need for more practical and collaborative educational approaches (Xu et al., 2025).

c. Policy Instruments Aspect

Inclusive policy instruments are needed to encourage the integration of urban farming and environmental education policies. Similarly, prioritisation of food security practices in the context of environmental education needs to be initiated starting from the policy formulation process (Nugroho et al., 2025). This is so that the policy framework and its implementation can be aligned with the principles of sustainability (Lourenzani et al., 2025). Previous studies by Nalumu et al. (2021) revealed that although the government has acknowledged the urgency of coherence of urban farming into the Adiwiyata school programme as a vehicle for sustainable food security education, it has not been supported by an operational policy that directs its integration into the formal curriculum.

The policy aspect is also related to the regulation of urban spatial functions, where education areas are not integrated with cultivation areas. Generally, schools are placed among relatively densely populated residential areas, so it is very natural that many schools do not have enough land to support urban farming programmes. For urban farming and Adiwiyata schools to flourish, local governments and communities need to place green infrastructure as a priority in urban planning (Otieno & Namiripo, 2019).

d. Inspirational Role Models Aspects

Documentation and dissemination of best practices have been carried out, but there is still a need for a role model of leadership at the local level to expand the scale of urban farming and Adiwiyata integration. Role models play a role in motivating implementers and target groups to be willing to implement the program (Bastian et al., 2021). Role model behavior is expected to help other individuals to understand goals and how to achieve them (Gartzia et al., 2021).

This research strengthens the literature on policy coherence by showing that cross-sectoral integration between education and food can have a double *dividend* in sustainable development. Policy integration can be an opportunity to prepare a more contextual and applicable educational design. Meanwhile, urban farming can be used as a practical means to understand environmental issues and food security. This study can also be used as a motivation for local governments to make policy innovations in the framework of strengthening sustainable food security. Policy integration is not only limited to administrative efficiency, but also as a strategy to expand the reach of social sustainability.

The results and discussions in this study show that there is a great opportunity for local governments and schools to integrate urban farming programs and Adiwiyata Schools within the policy framework of food security and sustainable human resource development. However, these opportunities can only be maximized if there is cross-sectoral commitment, a synchronized policy framework, and adequate resource support. With a reflective and collaborative approach, the integration of these two programs not only addresses sustainability challenges, but also creates a generation of empowered and environmentally conscious learners.

## CONCLUSION AND RECOMMENDATION

### Conclusion

This research seeks to examine the alignment between urban farming policies and the Adiwiyata School Program within the framework of sustainable human resource development and local food security. A literature review encompassing 50 carefully chosen scientific articles revealed that both initiatives possess significant integrative potential, particularly regarding their objectives, foundational principles, and community engagement.

The coherence of policies is evident in the shared values between urban farming, which serves as a tool for food security, and the Adiwiyata School Program, which functions as a platform for environmental education. Both initiatives emphasize participation, sustainability, and contextual learning. Nevertheless, the actual integration remains suboptimal due to issues such as institutional fragmentation, resource limitations, and the absence of cohesive policy frameworks at the regional level.

Field implementation indicates that when urban farming is incorporated into school programs, the outcomes extend beyond mere food production; they also enhance environmental literacy, social skills, and community cohesion. Comparative international studies affirm that a cross-sectoral approach linking education and urban agriculture has been effectively implemented in various countries, including Brazil, the Philippines, and Ghana, which can serve as valuable references for Indonesia.

However, challenges such as insufficient budget allocation, poor inter-agency coordination, inadequate human resource training, and cultural resistance at the school level must be addressed to prevent potential program failures. This highlights the necessity for policies that are not solely top-down but also promote local innovation, inter-regional learning, and long-term adaptability. Therefore, the integration of urban farming policies

with the Adiwiyata School Program presents a strategic opportunity to enhance food security while fostering a sustainable environmental learning ecosystem.

**Recommendations**

To enhance the integration of urban farming policies with the Adiwiyata School Program at the regional level, based on the research findings and insights from the study discussion, the following recommendations may be formulated:

a. Thematic Curriculum Integration in Schools

   Local authorities and educational institutions have the capacity to create thematic learning modules that incorporate urban agriculture techniques across various disciplines. The development of these modules can adopt a multidisciplinary strategy designed to motivate students to engage in hands-on, practice-oriented learning.

b. Preparation of Integrated Regional Policies

   Local authorities have the capacity to promote the development of policies that explicitly incorporate the Adiwiyata Program alongside urban agriculture as a cohesive sustainable development strategy. They can also create cross-sectoral task forces that engage multiple agencies and stakeholders, as well as establish operational standards to enhance coordination procedures, thereby reinforcing inter-sectoral collaboration.

c. Strengthening the Capacity of School Human Resources and Community Companions

   Local authorities coordinate and promote the development of human resources (including teachers, principals, and other educational staff) in areas such as urban agriculture, environmental education, and project-based learning methodologies. Furthermore, it also fosters the participation of agricultural extension agents and urban farming communities as collaborative learning partners within educational institutions.

d. Collaborative Funding Schemes and Incentives

   The national and local governments must allocate specific funds within the APBD/APBN for this integrative initiative. Furthermore, schools that effectively carry out program integration are rewarded with incentives such as increased budgets, support for facilities, or enhanced accreditation status.

e. Development of a Pilot Model of an Adiwiyata School Based on Food Security

Educational institutions should be motivated to serve as exemplars for other schools that have yet to incorporate urban farming policies into their adiwiyata school programs. Pilot schools can act as training hubs, sites for comparative studies, and sources of best practices that can be replicated.

Through the consistent and coordinated execution of these recommendations, the synergy between urban agriculture and the Adiwiyata School Program has the potential to evolve into an exemplary policy strategy for sustainable development at the regional level. This ensures that policy integration transcends mere symbolism, becoming a tangible practice aimed at cultivating a resilient, self-sufficient, and environmentally conscious generation.

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