

## Policy Integration of Food, Nutrition, and Environment in Governance Perspective

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**Abstract:** Policy integration across food, nutrition, and environmental sectors is increasingly recognized as a critical requirement for achieving sustainable development, given the complex interconnections among food resilience, malnutrition, and environmental degradation. Fragmented, sectoral policy approaches have proven insufficient to address these multidimensional challenges. This study aims to examine how the integration of food, nutrition, and environmental policies is reflected in empirical food system indicators and to assess its implications for development governance. The study employs a qualitative research design using qualitative content analysis based on big data. Secondary data are sourced from *Our World in Data*, focusing on three key indicators: agricultural land use as an environmental dimension, prevalence of undernourishment as an indicator of food and nutrition resilience, and child stunting prevalence as a measure of long-term nutritional outcomes. The analysis is conducted descriptively and interpretively to identify trends and interrelationships among indicators within a policy integration framework. The findings indicate that stability in agricultural land use does not automatically lead to improved nutritional outcomes. Although reductions in undernourishment and stunting occur in certain periods, these improvements are often uneven and vulnerable to external shocks. This suggests that food and nutrition policies that lack strong integration with environmental management and social protection mechanisms have limited capacity to generate sustainable impacts. Nutritional improvements appear to be more closely linked to effective cross-sectoral interventions than to food production policies alone. This study highlights the importance of cross-sectoral policy integration as a governance prerequisite for achieving food resilience and sustainable nutrition outcomes, while acknowledging limitations related to the use of aggregate data and the absence of causal analysis.

**Keywords:** Integration policy, Nutrition, Environment, Resilience food, Development sustainable

## Introduction

Food, nutrition and the environment is three issue mutually strategic related and become attention main in the development agenda global sustainability. System modern food does not only play a role in provide food for population, but also has an impact direct to quality nutrition public as well as condition environment through use land, water, energy, and greenhouse gas emissions glass (Wihardjaka, 2018). Report High-Level Panel of Experts confirm that system food is connector main between production agriculture, consumption food, health humans, and sustainability ecosystem (HLPE, 2017). In line with that, Swinburn et al. (2019) introduce draft global syndemic which explains relatedness close between obesity, deficiency nutrition, and changes climate as consequence from governance failure system food. Therefore that, approach integrated policies between food, nutrition and environment become the more important, especially in governance framework capable governance coordinate various sectors and actors in a way effective (Frandika, Lufitasari and Irkham Pambudi, 2023).

Various study previously has show that integration policy system food can give benefit simultaneous for health humans and sustainability environment. Béné et al. (2020) show that system food is one of the driver main global unsustainability, but also has potential big For become solution if managed in a way integrated. Concept policy double-duty and triple-duty proposed by Hawkes et al. (2020) confirm that One policy can designed For overcome various problem at once, like lack nutrition, disease no infectious, and degradation environment. Findings similar was also reported by Burgaz et al. (2023) through scoping review international, which concludes that policy system integrated food dimensions nutrition and environment tend give impact positive to diet quality, endurance food, as well as practice agriculture sustainable. However thus, the effectiveness policy it is highly dependent on the context of governance and coordination cross the underlying sector (Dinarwati and Nurfadilah, 2025).

Although literature about system food and policy nutrition Keep going developing, still there is a number of gap significant research. First, some big studies tend analyze policy food, nutrition and environment in a way separate, so that Not yet capable catch complexity interaction inter domain in One framework comprehensive analysis (Parsons, Hawkes and Wells, 2019). Second, fragmentation institutional and weak coherence policy between sector Still become challenge main in implementation policy integrative in many countries (Candel and Pereira, 2017). Ridgway et al. (2015) show that although there is confession to importance sustainability environment in policy food and nutrition, considerations the often not implemented in a way consistent consequence pressure politics and domination interest sectoral. Third, still limited study empirically which special study integration policy food, nutrition and environment from governance perspective government that includes actors, institutions, and mechanisms taking decision.

Based on gap said, research This offer novelty with develop approach integrative that places policy food, nutrition and environment in One governance framework (governance perspective). Different from study previously more emphasize on results policy or impact sectoral, study this focuses on how the governance process including coordination cross sector, involvement stakeholder interests, as well as mechanism implementation and evaluation influence level integration policy. With refers to the governance framework system food developed by Termeer et al. (2018), research This make an effort expand understanding about role institutions and actors in build coherent and sustainable policies. Approach This expected can bridge gap between draft integration policies and practices governance in the field.

Study This aim for analyze to what extent the policy food, nutrition and environment integrated in governance framework government as well as identify supporting and inhibiting factors integration said. In a way special, research This answer Question: (1) How? form and level integration policy food, nutrition, and environment; (2) governance factors What only that affects the integration process policy; and (3) what is an effective governance model? For strengthen policy integrative system food. The research method used is mixed methods with combine analysis document policy, interview deep with stakeholder interest cross sector, as well as analysis network policy (policy network analysis). Approach This allows comprehensive understanding about dynamics policy and governance system food in support sustainability and health public.

## Literature Review

Policy integration food, nutrition and environment the more become focus main in study policy public and development sustainable. Literature international confirm that system food is system complex that connects production, distribution, and consumption processes food with results nutrition and impact environment in a way simultaneous (HLPE, 2017). Dependence system food to source Power natural make sector This as one of the contributor main greenhouse gas emissions glass, degradation land, and loss diversity life, at the same time as determinant main diet quality and health status public (Béné et al., 2020). Therefore that, approach policy fragmented sectoral assessed no Again adequate for answer these multidimensional challenges, so that required integration policy cross sector in governance framework governance.

In perspective policy public, policy integration understood as effort align objectives, instruments, and policy processes cross sector for reach more results coherent and effective (Candel and Pereira, 2017). In context food, nutrition and environment, integration policy aim for ensure that policy agriculture no only chase productivity, but also supports quality nutrition and sustainability environment (Ifall and Unsunnidhal, 2023). Parsons et al. (2019) emphasize that approach system food (food systems approach) allows analysis connection cause and effect between sector, so that

can avoid mutually beneficial policies contradictory, such as subsidy food that increases production but make things worse diet quality or damage environment. Literature this show that integration policy is prerequisite important for achievement system food sustainable.

A number of the study also highlighted role policy double-duty and triple-duty as form concrete from integration policy food, nutrition, and the environment. Hawkes et al. (2020) explain that policy double-duty actions designed For handle more from one form malnutrition in a way simultaneously, while policy triple duty expand coverage with enter dimensions sustainability environment. For example is promotion pattern eat based food local and plant-based that are not only increase quality nutrition, but also reduces emission carbon and pressure to ecosystem (Carey et al. , 2023). Empirical evidence from various countries show that policy kind of This more effective when supported by coordination cross sectors and a strong governance framework.

The governance perspective becomes element key in understand How integration policy can realized in practice (Dewi, 2019). Governance system food covers interaction between actor government, sector private sector, community civil, and community local in the process of formulation and implementation policy (Termeer et al. , 2018). Governance studies show that that success integration policy is highly dependent on mechanisms horizontal coordination between ministry as well as coordination vertical between level national and local. Ridgway et al. (2015) show that although principle sustainability has recognized in policy food and nutrition, weakness governance mechanisms cause principle the often not implemented in a way consistent.

Literature also makes the connection failure integration policy food, nutrition and environment with emergence phenomenon global syndemic, namely relatedness between obesity , deficiency nutrition , and changes climate (Swinburn et al. , 2019). Phenomenon this reflect impact systemic from policies that do not coordinated and tend sectoral. This study confirm that without integrative governance, policies in one sector potential make things worse problems in other sectors. Therefore that, integration policy No only viewed as choice normative, but as need structural in respond challenge development sustainable.

Although literature about system food and integration policy Keep going developing, still there is a number of significant research gap. First, some big study focus on analysis conceptual or studies case single , so that Still limited proof empirical comparative about how integration policy food , nutrition and environment implemented in governance context different governments (Candel and Pereira, 2017). Second, many studies put integration policy as objective normative without study in a way deep governance mechanisms that enable or hinder integration the (Exley et al. , 2024). Third, there is still minimal research that specifically explicit connect level integration policy with governance performance and results measurable policies in One framework comprehensive analysis.

Based on gap said, research this offer novelty with develop analysis integration policy food, nutrition and environment in a way simultaneous in governance perspective government. Different from study previously tended to sectoral, study this put governance as variables the key that bridges objective policy cross sector with practice implementation. Novelty other lies in the merger dimensions structure institutional, actor policies and mechanisms coordination in one analytical model. With thus, research This no only contribute to enrichment literature policy public and system food, but also provides implications practical for designer policy.

Based on study literature said, the framework study in studies This built with put integration policy food, nutrition and environment as variables main factors influenced by governance factors, such as coordination cross sector, participation stakeholder interests, and coherence policy. Framework this assume that strong governance will increase level integration policy, which in turn impact positive to sustainability system food and produce nutrition society. Framework study this become base analysis empirical for evaluate how integration policy can strengthened through effective and contextual governance mechanisms.

## Method

Study This use approach analysis content qualitative (qualitative content analysis) because characteristics problems studied nature complex, multidimensional, and based policy public. Policy integration food, nutrition and environment no only can understood through measurement quantitative, but need interpretation deep to meaning, direction, and coherence policies that are reflected in documents, narratives, and frameworks institutional (Thow et al. , 2018). Analysis content qualitative allows researchers For identify patterns, themes, and relationships conceptual in text policy as well as relevant secondary data in a way systematic and transparent (Hall and Steiner, 2020; Isoaho, Gritsenko and Mäkelä, 2021). This method is also widely used used in study policy public and governance system food because capable catch dimensions normative, discursive, and contextual from integration policy cross sector (Minotti et al. , 2022). With thus, the analysis content qualitative considered most appropriate for study how policy food, nutrition and environment each other connected in governance perspective government.

For strengthen depth analysis, research This adopt approach qualitative big data analysis, namely large-scale data utilization large, non - reactive and processed in a way interpretive. Qualitative big data No only refers to the volume of data, but also to the diversity and complexity data sources analyzed in a way thematic and contextual (Lochmiller, 2021; Chandrasekar et al. , 2024). In the context policy public, approach this allows researchers For examine trend policy cross time and across countries as well identify relatedness inter -domain policy in a way systemic (Trein, Meyer and Maggetti, 2019). Analysis done through the coding process open, axial, and selective for grouping indicator food,

nutrition and environment to in themes integration policy and governance. Approach this in line with development latest in study policy big data based that combines the power of quantitative data with depth interpretation qualitative (Chen and Wojcik, 2016).

Primary data source study This originate from Our World in Data (OWID) <https://ourworldindata.org/> , a reputable global data platform international that provides open data sets related food, nutrition, health, and the environment. OWID compiles data from various institutions credible such as FAO, WHO, World Bank, and IPCC, as well as Lots used in study scientific cross discipline. The data used covering indicator resilience food, patterns consumption nutrition, greenhouse gas emissions glass from system food, as well as indicator relevant environment. The data analyzed in a way qualitative through interpretation trends, narratives policies, and the governance implications that arise from relatedness inter-indicator. With using OWID as data sources, research this get profit in the form of consistency methodological, long temporal coverage, and comparability cross- country. The entire analysis process done in a way transparent and systematic for ensure credibility, dependability, and confirmability findings study.

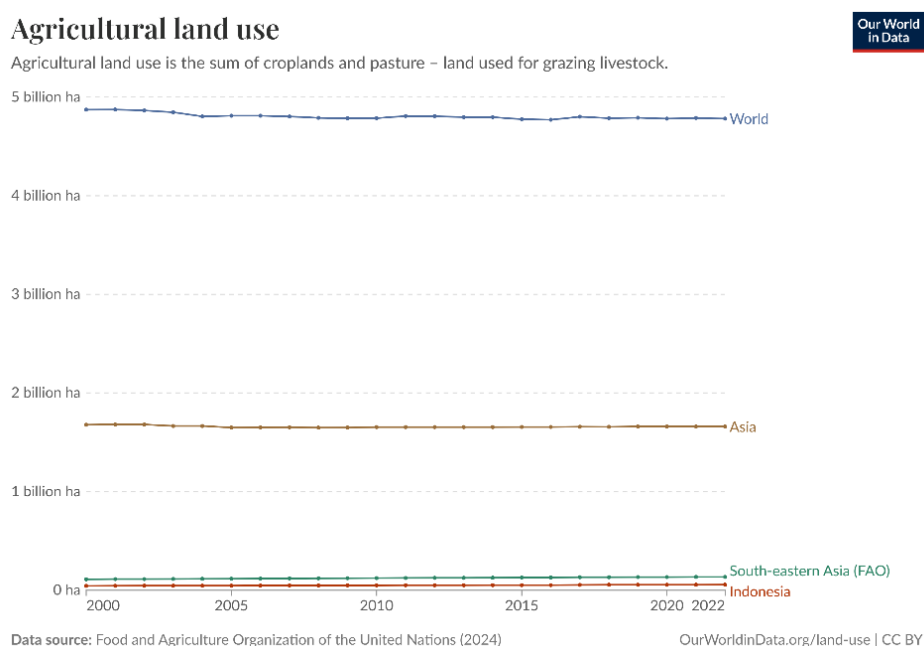
## Results

Results section study This serve findings main thing that is obtained from analysis content qualitative against

secondary data global and national scale sourced from from Our World in Data. Analysis focused on three indicator key that represents relatedness between policy food, nutrition and environment, namely use land agriculture as dimensions environment system food, prevalence resident not enough nutrition as indicator resilience food and nutrition, as well as prevalence of child stunting as reflection quality nutrition term long. Third indicator the analyzed in a way integrated For reveal patterns, trends, and governance implications policy cross sector in context development sustainable. Presentation results This No only aim describe dynamics empirically each indicator, but also highlights to what extent is integration policy food, nutrition and environment has formed as well as governance challenges that still exist faced.

**Agricultural Land Use as Dimensions Environment Food System**

Usage data land agriculture show that globally, widely land agriculture relatively stable in the range almost 5 billion hectares since 2000 to 2022. Stability This reflect limitations expansion land world agriculture due to pressure environment and policy conservation. At the regional level, Asia shows patterns that are also relative stagnan with wide land around 1.6–1.7 billion hectares, signifying that improvement production food in the area This No Again depending on the expansion land, but rather on intensification and efficiency use source power.



**Figure 1.** Agricultural land use from 2000-2022

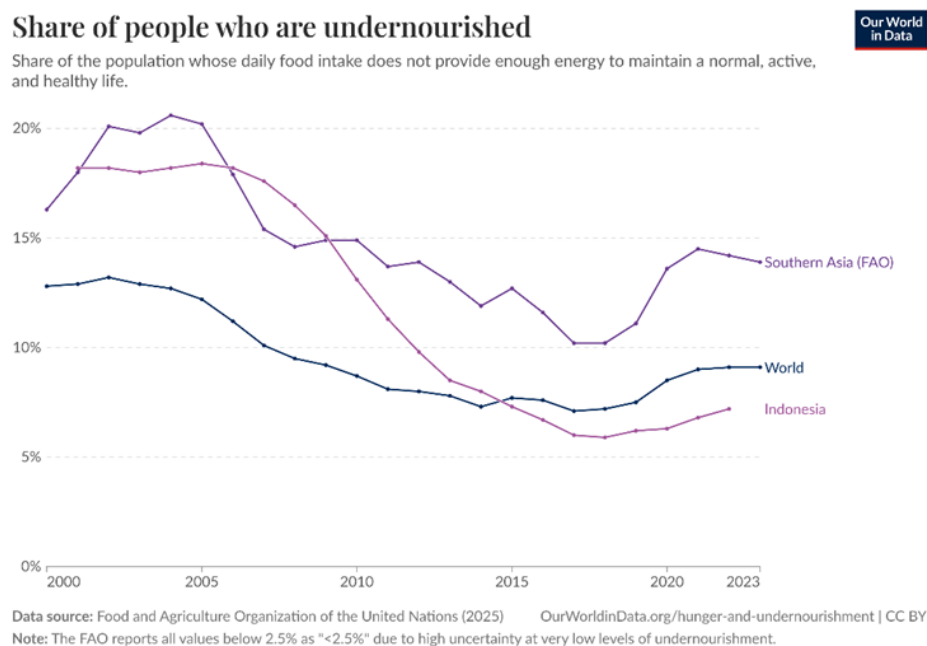
In Southeast Asia, the area land agriculture be in a far range more small compared to Asia as a whole overall, but show trend increase in a way slowly. Indonesia as part from Southeast Asia region has wide land relatively agricultural stable with A little improvement throughout period observation. Findings This indicates that Indonesia is facing limitations structural in expansion land agriculture

consequence competition with other sectors such as industry, settlements, and conservation environment. In the context of governance, conditions This confirm importance integration policy environment and food to increase production No done with sacrifice sustainability ecosystem.

**Prevalence Malnourished Population as Indicator Food Security and Nutrition**

Prevalence data residents who experience lack nutrition show trend quite a decline significant in Indonesia since early 2000s to around 2018. At the beginning period, proportion resident not enough nutrition in Indonesia is above 15 %, then

decrease until approaching 6% in 2018–2019. The decline This reflect success relatively policy food and nutrition, such as improvement availability food, protection programs social, and intervention nutrition base.



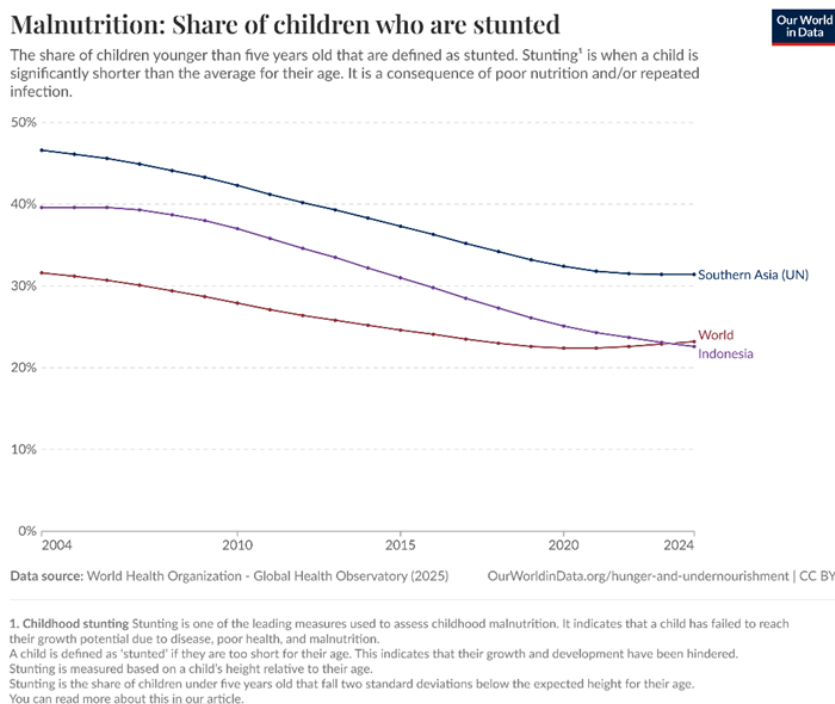
**Figure 2.** Share of people who are undernourished from 2000- 2023

However, after 2019, it looks like existence improvement return prevalence resident not enough nutrition in Indonesia, although still is below the world average and the South Asian region. This pattern also occurs globally, where the prevalence undernourishment of the previous world decrease experience reversal trend since around 2018. Phenomenon This indicates vulnerability system food to shock external, such as crisis economy, pandemic, and disruption chain supply food. In perspective integration policies, findings This show that improvement availability food no in a way automatic ensure resilience sustainable nutrition. Without coordination policy cross sector especially between sector food, health and social protection achievements decline hunger can with fast eroded

by the crisis. This is confirm the need for governance adaptive and integrated policies for guard stability system food and nutrition.

**Child Stunting as Reflection Nutritional Quality and Policy Governance**

Child stunting indicators give a clearer picture deep about quality nutrition and effectiveness policy term long. Data shows that the prevalence of stunting in children in Indonesia has increased decline significant from around 40% in the early 2000s to around 22–23% in 2023–2024. The decline this in line with global trends, although Indonesia’s stunting rate is still relatively tall compared to the world average.



**Figure 3.** Share of children who are stunted 2004-2024

Compared to South Asia region, Indonesia shows better performance good, but still face challenge big for achieve the global target of reducing stunting. Stunting is indicator nutrition chronic which is greatly influenced by factors cross sectors, including resilience food house stairs, access service health, sanitation, education mother, and condition environment. Therefore that, repair indicator this reflect success partial integration policy, but also shows limitations coordination policy in reach determinant more nutrition wide.

### Interrelationship between indicators in Policy Integration Perspective

If the third indicator analyzed in a way integrated, visible that stability use land agriculture no always compared straight with improving nutritional status society. Although Indonesia does not experience expansion land significant agriculture, prevalence lack nutrition and stunting show trend decline in term long. This is indicates that improvement welfare nutrition no only depending on the dimensions production, but also on governance distribution food, access economy, and intervention nutrition specific. However, the reversal trend decline undernourishment post 2019 reveals weakness integration policy in face shock systemic. Dependence on policy sectoral, without strong coordination between sector food, health, and the environment, causing system food become not enough resilient. In the context of this, policy restrictive environment expansion land need balanced with policy food and nutrition that encourages efficiency, diversification food and patterns consumption healthy.

### Implications of Governance for Policy Integration

Research result This show that challenge main No lies in the availability land or food in a way aggregate, but on governance policies that connect the three domains. Stability land agriculture show success relatively policy environment, while the decline in stunting reflects impact positive policy nutrition and health. However, fluctuations prevalence lack nutrition confirm that integration policy not yet fully consistent and sustainable.

With thus, the results This strengthen argument that integration policy food, nutrition and environment must understood as a dynamic governance process. Without mechanism coordination cross strong sector, achievements in one domain have potential no sustainable and even weaken consequence pressure external. Therefore that, the result study this confirm importance approach policy integration in perspective governance For strengthen resilience system food, increasing quality nutrition, and maintaining sustainability environment in a way simultaneous.

### Discussion

Research result show that dynamics between use land agriculture, prevalence lack undernutrition and child stunting reflect complexity connection between policy food, nutrition and environment in governance perspective. Stability use land agriculture globally and regionally, including in Asia and Southeast Asia, indicates that expansion land no another main strategy in system food contemporary. Findings This in line with argument that system world food has reaching ecological limits certain so that improvement production more lots depends on intensification and efficiency, not expansion land

(Gerten et al. , 2020; Varzakas and Smaoui, 2024). In the context of governance, the conditions This confirm importance integration policy environment and food so that efforts improvement production No sacrifice sustainability ecosystem.

However thus, the literature also shows that stability wide land agriculture No always identical with sustainability environment. Intensification production that is not accompanied with regulations strong environment potential speed up degradation land, water pollution, and improvement greenhouse gas emissions glass (Béné et al. , 2020). Findings study this strengthen view that, that integration policy food and environment Still tend nature partial. Policy agriculture often more focused on productivity, while dimensions ecological placed as issue complement, not an integral part of planning system food. This is in line with Candel and Pereira's (2017) criticism which states that policy food in many countries is not yet fully integrated in a way cross sector.

In dimension nutrition, trends decline prevalence undernourishment in Indonesia to around end the 2010s decade showed existence achievements positive from policy food and social that has implemented. Findings this support literature stating that improvement access food, stability prices, and protection programs social can contribute to decline hunger chronic. However, the reversal trend in the period furthermore show that achievement the still fragile and highly influenced by factors external. Condition This strengthen the view of Hawkes et al. (2020) and Fanzo et al. (2021) that resilience food and nutrition no can depends on policy sector food only, but need integration with sector health, economy, and protection social.

Some research previously argue that improvement production food national in a way automatic will lower prevalence lack nutrition. However, the findings study this show more results contrast. Although production and availability food relatively awake, prevalence undernourishment still can increase when power buy public decrease or when system distribution and protection social weakening. This is strengthen argument that problem nutrition is multidimensional and is greatly influenced by factors access, not only availability. With thus, integration policy food and nutrition become prerequisite main for reach resilience sustainable food.

Decline the prevalence of stunting in children in Indonesia is one of the most significant findings in study this. A relative decline consistent for two decades final show success intervention nutrition term length that is cross sector. Literature in a way wide confess that stunting is not only influenced by intake food, but also by health mothers, sanitation, education, and conditions social economy (Vaivada et al. , 2020; Kalinda et al. , 2024). Therefore that, the findings this support view that approach more policies integrated capable produce greater impact sustainable compared to approach sectoral.

Although thus, the prevalence of stunting in Indonesia is still is above the global target and has not yet fully parallel with trend decline in several other countries. This show that integration existing policies still face constraint in matter

equality implementation and effectiveness of governance at the level local. Findings This in line with Ridgway et al.'s (2015) study which highlights that weakness coordination between institutions and differences priority policy can hinder the success of the nutrition program, although in a way national framework policy Already Enough comprehensive.

Relatedness between third analyzed indicators show that progress in one dimensions no in a way automatic followed by progress in dimensions others. Stability use land agriculture no in a way direct correlated with reduction in stunting or undernourishment, which indicates that sector agriculture is just one of them part from system better food and nutrition wide. Findings This support framework system food that emphasizes importance connection between subsystem production, distribution, consumption, and environment (Fanzo et al. , 2021). From a governance perspective, this This confirm that integration policy must nature systemic, not just coordination administrative between ministry.

Governance literature policy show that integration effective policies need mechanism formal coordination, goals together cross sector, as well as indicator mutual performance connected (Candel and Pereira, 2017; Termeer et al. , 2018). Findings study this strengthen argument said, because fluctuations in indicators nutrition show existence limitations governance capacity in respond change external in a way fast. Global shocks, such as crisis economy and pandemic, it is proven capable bother achievement nutrition although previously show trend positive. This is in line with findings of Laborde et al. (2020) which confirm that system global food is very vulnerable to crisis and requires adaptive governance.

From the perspective policy public, results study this indicates that integration policy food, nutrition and environment must understood as a long-term process length required commitment cross sectors and across levels of government. This integration No only covers planning policies, but also implementation and evaluation that take into account impact cross sector. Approach adaptive governance become relevant in context this , because allows policy for adapt self with change condition social , economic and environmental (Termeer et al. , 2018).

In a way overall, discussion this show that findings study consistent with part big literature that emphasizes importance integration policy in system food and nutrition, but also reveals existence gap between framework policy and reality implementation. Findings this at a time contrast too much of a view emphasize on solutions technical and production food solely, with confirm that challenge nutrition and sustainability environment need a holistic and integrated governance approach.

## Conclusion

This study conclude that integration policy food, nutrition and environment in governance perspective is factor key in explain dynamics resilience food and nutritional status, especially in Indonesia in global and regional context.

Analysis results show that stability use land agriculture no in a way automatic compared straight with repair indicator nutrition, such as decline prevalence lack child nutrition and stunting. Although happen progress significant in reduction in stunting and reduction undernourishment during the period certain, achievements the nature vulnerable and can experience reversal consequence weakness integration cross sectors and exposure to shock external. Findings this answer question study with confirm that resilience food and repair nutrition no can achieved through policy sectoral only, but need an integrated governance approach policy food, nutrition and environment in a way systemic and sustainable.

Contribution main study this lies in the provision of proof empirical evidence that strengthens approach policy integration in study system food and nutrition. With elaborate indicator environment, food and nutrition in a way simultaneous research this enrich literature that has been This tend fragmented between sector. Research this also contributes in a way conceptual with put integration policy in governance framework (governance perspective), so that capable explain why progress on one sector no always produce consistent impact on the sector others. In practical, findings study this give implications relevant policies for designer policy public, in particular in formulate development strategies better food and nutrition adaptive, cross sector, and responsive to change environment as well as dynamics social economy.

Although thus, research this own a number of limitations. First, the research this using secondary data aggregate so that not yet capable catch variation policies and implementation at the level subnational. Second, the approach analysis content qualitative big data-based limit ability study for identify connection causal in a way direct between indicators. Therefore that, research furthermore recommended for combine approach qualitative with method quantitative or studies case in depth to explore mechanism policy in a way more detailed research future is also necessary enter better governance indicators specific, such as coordination institutions and capacity implementation policy, so that integration policy food, nutrition and environment can analyzed in a way more comprehensive and contextual.

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