

Research Article

“The Problem of Food Security in the Indonesia Border Area of Nusa Tenggara Timur Province with Timor Leste Country”

Posma Sariguna Johnson Kennedy

Faculty of Economics and Business, Universitas Kristen Indonesia, Jakarta, Indonesia

Abstract.

Areas in Nusa Tenggara Timur (NTT) have a high food vulnerability. This study aims to analyze food security in the NTT border region with Timor Leste, thus understanding how to strengthen community food security. The research method used is descriptive to provide a systematic, factual description of the facts, and characteristics of the phenomena investigated. The low performance of farming influences food vulnerability due to the nature of rainfall that does not support agriculture and the little ability of farmer governance and access to innovation and technology. Food security policy strengthens and is needed for border communities and outermost islands. The average distance from the town to the nearest permanent/semi-permanent market is too far. The local community’s strategy in dealing with a food vulnerability situation resulting from the hunger risk is to use food that has existed in the past, according to naturally occurring local wisdom. The problem of food security on the border of East Nusa Tenggara needs to be a top priority for Indonesia’s development on the border.

Keywords: food security, agriculture, border area, Nusa Tenggara Timur, Timor Leste

Corresponding Author: Posma Sariguna Johnson Kennedy; email: posmahutasoit@gmail.com

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1. Introduction

In recent developments, the spectrum of “threats to” is extended to not just traditional threats. The achievement experienced a shift in pressure, from security achieved through “armament” towards security, which was realized through “human development” From the emphasis on “territorial” safety towards “employment, food, and environmental protection” [1,2].

Food is a necessary commodity, so fulfilling its needs becomes part of the state’s responsibility, involving all societal elements. “Food security is defined as meeting individual food needs as indicated by the availability of adequate, equitable, and affordable quantity and quality. The agricultural sector has a strategic and fundamental role in building sustainable food independence, carried out through self-sufficiency in

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production [3,4,5]. Food security is a condition of fulfilling food for households, reflected in the availability of sufficient food, both in quantity and quality, safe, equitable, and affordable. In contrast, food sovereignty is the right of the state and nation to determine the meaning of food independently” [6]. Which guarantees the price of food for its people and gives the community the right to determine the system of food agriculture based on the potential of local resources. [7,8,9]

Water, energy, and food are fundamental sources of life in Indonesia. Meeting food needs and keeping energy prices affordable is an essential strategy for maintaining national resilience as a modern threat model that must be faced by every nation in the world [10,11,12]. RI-Law No.18/2012 said, “Food Security is a condition for the achievement of food for the state, up to the individual. It is reflected in the availability of sufficient food, both in quantity and quality, safe, diverse, nutritious, equitable, and affordable. It does not conflict with the community’s religion, beliefs, and culture to live healthy, active, and productive in a sustainable manner” [13]. Food security is an integrated food economic system consisting of various subsystems. The main subsystems are food availability, distribution, and consumption [14,15,16]. Efforts to develop agriculture in border and disadvantaged areas face multiple interrelated obstacles [17,18].

The Global Food Safety Index ranked Indonesia 74th out of 109 countries for food security in 2015. “More than a third of children under five show stunted growth. Rice is a staple food in Indonesia and accounts for 45% of total food intake or 80% of the primary carbohydrate sources in Indonesian food. The main strategies for achieving self-sufficiency include increasing productivity, expanding planting areas, and protecting cultivated land from conversion to other land uses. Food diversification is also considered important in food security [19]. For Indonesia, water is the core of safety in supporting food security, especially food security. A watershed system is needed to support the amount of water flow. The problem of drought in the dry season and flooding in the rainy season in the river system indicates an imbalance in the hydrological cycle. It happens not only in water retention, which is very important for vegetation. Global climate change also influences weather and climate patterns [6].” [20]

National food policies naturally strongly influence a Portrait of Indonesian Food Security in NTT. Indonesia’s national food security has yet to experience significant improvement. It means that the Government’s programs have yet to increase food security in this country effectively [21]. Changes in NTT people’s food patterns from various local staple foods to rice, while the number of potential lowland rice fields has

created NTT's dependence on rice supplies from outside NTT, is quite high. It is one of the past impacts of the "privatized" program by the Government. The NTT Food Security Agency has made a considerable effort to return corn as the leading staple food for the people of NTT to reduce NTT's dependence on rice supplies from outside NTT, but the people have already loved rice.

The acceleration of agricultural development in the border region, especially in the eastern part of Indonesia, Nusa Tenggara Timur (called NTT) - Democratic Republic of East Timor (RDTL), must comprehensively cover technical and technological, socio-cultural, and economic aspects. Regarding financial status, the NTT region has advantages over RDTL, shown by the ability to supply (export) agricultural goods and commodities to the RDTL region [22,23]. Border area management is carried out by the National Border Management Agency (called BNPP), coordinating related institutions such as departments in Government and regional governments. The national central BNPP institutional coordination mechanism is based on Presidential Regulation No. 12 of 2010 [24].

This study aims to analyze food security in the NTT border region with RDTL. It is thus gaining an understanding of the problems and solutions for strengthening community food security. This paper reviews the opportunities for agricultural development in the border region, including a study of the existing conditions of agriculture in the border region, identification of problems encountered, and policy recommendations implemented. It was done to support the development of regional agriculture, which in the end, lifted the economy of the people in the border region so that they could compete with neighboring countries [25].

2. Methods

Using a quantitative description approach using secondary data from the Ministry of PPN/Bappenas Deputy for Development, an analytical method was conducted using a thematic approach. The scope is grouped into five categories: availability, accessibility, affordability, sustainability, and stability, as seen in the table below [26].

Interviews were also conducted with key informants, namely regional heads in border areas, such as the Regent of Kupang Regency, Deputy Regent of North Central Timor Regency, Regent of Belu Regency, Regent of Malaka Regency, as well as the Chair of the Nusa Tenggara Timur Regional People's Representative Council.

TABLE 1: Scope and Variables of Food Security in NTT Province.

Category	Component	Indicator
Availability	Food productivity	Rice field productivity; Corn productivity; Green bean productivity; Peanut Productivity; Soy Productivity; Cassava Productivity; Sweet potato productivity.
	Fisheries production	Capture fisheries production; Aquaculture production.
	Animal Husbandry Production	Poultry production; Livestock production.
	Consumption of cereals	Normative consumption of the net availability of cereals.
Accessibility	Irrigation Land	The ratio of rice fields, gardens, and fields to the area; The ratio of irrigated rice area compared to the total paddy field area.
	Infrastructure	Index of road density; Good road
	Market access	The ratio of villages to permanent/semi-permanent market buildings; Average estimated distance to the market with the nearest permanent/semi-permanent building.
Affordability	Poverty	Poverty rate; Poverty depth index; Poverty severity index.
	Per capita expenses	Per capita expenses
	Infant health	Low Birth Weight Babies; Malnutrition Babies.
Sustainability	Labor	The ratio of food crop households; The ratio of aquaculture households; The ratio of capture fisheries households.
	Agricultural land	The ratio of land area to RTTP; Average conversion rate of agricultural land (in 5 years or more).
Stability	Livestock population	Livestock population; Poultry population.
	Disaster Mitigation	Flood disaster hazard; Landslide hazard; Extreme weather disaster hazard; Drought hazard.

Source: Modified Analysis of Regional Formation and Analysis [26]

3. Results And Discussion

The potential for food supply for the entire NTT region is relatively large. Manggarai, Ngada, East Flores, Lembata, and Alor are the five largest districts. At the same time, the five lowest regencies in the percentage of their territory in the food supply are Belu, Rote-Ndao, West Sumba, Southwest Sumba, and Central Sumba. The power of food support in NTT Province (Table 2) for Non-Rice Food experienced a surplus of 1,696,501 tons, while rice food experienced a deficit of 15,700 tons. Thus, food diversification exists to meet the need for carbohydrate-based food. [27]

TABLE 2: Food Carrying Capacity in NTT Province 2017.

Description	Number of Population	Unit	Needs Ton/year equivalent to rice	Surplus/Deficit
Total Population	5,287,302	People	734,935	
Rice	719,235	Tons		-15,700
Non-Rice Food	2,431,436	Tons		1,696,501

Source: SIPD NTT (2018)[28]

The Desirable Dietary Pattern (DDP) is a composition of food diversity based on energy contributions from major food groups at the level of food availability and consumption. DDP is an instrument to assess the situation of regional food consumption that can be used to plan future food consumption needs, taking into account social, economic, cultural, and community food consumption preferences. In 2013 DDP NTT was 66.20 increased in 2016 to 73.00. It shows that people’s food patterns are moving in a better direction.

TABLE 3: The Desirable Dietary Pattern (DDP) Score in NTT Province 2012-2016.

Indicator	Year (%)			
	2013	2014	2015	2016
DDP score	66,2	65,0	71,3	73,0

Source: BPS NTT (2018)[29]

There is a significant difference between households in NTT accessing proper water for urban and rural populations. Still, about 40% of the rural population consumes improper water. Poor quality water is a direct cause of various sources of disease. In 2017, drinking water services were 65.20%, as shown in the Figure below.



Figure 1: Percentage of Households with Decent Drinking Water (2014-2017). Note blue: urban, red: rural, green: urban and rural. Source: Pemprov NTT (2018)[27].

In general, existing land in NTT Province provides water purification management services that are relatively high. Regencies classified as having a large percentage of the high potential estate in the provision of these services are Timor Tengah Selatan Regency covering 5.56%. Kupang Regency covers 5.53%, and Ende covers 3.36% of the total land. For a large land area, the potential is shallow to low in the provision of water purification regulating services found in East Sumba, which has shallow potential, covering 7.0% of the total land area in NTT. East Sumba Regency has a lot of surface water that flows from neighboring Regencies. However, relatively rare vegetation makes it difficult to purify water, which causes low water quality in the Regency.

Regarding weather, districts/cities in NTT generally only have relatively narrow land that can significantly influence the environment. The three regencies that have the highest percentage of potential in managing climate successively from the highest to the lowest are Alor Regency (covering 2.97% of the total land in NTT), West Manggarai (including 2.70%), and Ende (covering 2.59%). High-category climate regulation services are found in Timor Tengah Selatan District (covering 3.80%) and Kupang District (covering 3.39% of the total land area in NTT). A land dominated by dense forested mountains and plantations and rivers, dams, and reservoirs in these five districts makes them exceed the other regions regarding climate regulation. Extensive vegetation cover makes temperatures in these districts lower than in other areas in NTT.

The following is a mapping of the NTT Province in achieving thematic health in the table below.

TABLE 4: Results of Food Security Analysis at the Border of NTT Province.

No	District	Status 1	Status 2	Status 3	Status 4	Status 5
1.	Malaka					
2.	Alor					
3.	Kupang					
4.	Timor Tengah Utara					
5.	Belu					

Note: Status1: Availability; Status2: Accessibility; Status3: Affordability; Status4: Sustainability; Status5: Stability.

Color Description: Red: Low Status, Priority 1; Green: Medium Status, Priority 2; Blue: High Status, Priority 3.

Source: Modified Analysis of Regional Formation and Analysis [26]

The best food security is in Alor District; the second is in Kupang District. At the same time, the worst is Malaka District, although other districts, such as Belu and Timor Tengah Utara, must be considered. Of the five variables that must be regarded as

primarily the stability issue, the second variable is sustainability. Based on the mapping above, the main problems and programs to overcome them can be seen below.

TABLE 5: Main Problems in Resilience in the Border Region of NTT Province.

Categories	Main Problem	Program and Activity
Availability	- Low productivity of lowland rice, dry rice, corn, green beans, peanuts, soybeans, cassava, and sweet potatoes; - Low capture/aquaculture production; - Low production of poultry/livestock; - Consumption of sereralia is higher than production in the district/city; - Low percentage of the area of paddy fields, gardens, and fields in the area; - Low ratio of irrigated paddy to total paddy area.	Food Security Program: - Increased production of agricultural products; - Application of agricultural technology; - Empowerment of agricultural extension workers; - Development of capture fisheries and aquaculture; - Increasing livestock production and application of animal husbandry technology; - Increased food security; - Opening of rice fields and making irrigation channels.
Accessibility	- Low density of roads (length of road sections per 100 km ² area); - Low good road ratio; - High ratio of villages without permanent or semi-permanent buildings; - The average distance of the village to the nearest permanent/semi-permanent market is too far.	Food Security Program: - Construction and maintenance of roads; - Development of permanent/semi-permanent markets; - Rehabilitation of market buildings.
Affordability	- High poverty rates; - High depth and severity index of poverty; - Expenditures per capita in district/city areas are still below the provincial average; - Low consumption of calories and protein per capita; - The number of malnourished babies is still high; - High percentage of babies with Low Birth Weight	Poverty Reduction Program: - Increasing social assistance for the poor, especially those working in the agricultural sector. - Improved maternal and infant health.
Sustainability	- Low percentage of household food crops, aquaculture, and capture fisheries; - Low mastery of agricultural land; - High rate of conversion of agricultural land; - The high potential of unemployed land; - Low livestock and poultry populations.	Farmers and fishers welfare improvement program: - Improvement of farmers' welfare; - Structuring the control, ownership, use, and utilization of land; - Spatial planning; - Provision of livestock and poultry breeds; - Prevention of livestock and poultry diseases.
Stability	- High vulnerability to floods; - High vulnerability to landslides; - High vulnerability to extreme weather disasters; - High vulnerability to drought;	Disaster Mitigation Program: - Prevention and reduction of disaster risks; - Community empowerment in disaster preparedness; - Preparation of preparedness plans and their mitigation in the event of a disaster; - Installation of an early warning system; - Establishment of a disaster-resilient village; - Increased dissemination of disaster information (culture of disaster awareness); - Preparing an evacuation route in case of a disaster.

Source: Modified Analysis of Regional Formation and Analysis [26]

The main thing that needs to be done is to gradually reduce NTT's dependence on rice supplies from outside NTT by (1) Optimizing the potential of paddy fields in NTT accompanied by an improvement in rice cultivation systems. (2) Empowering the possibility of dry land for upland rice cultivation. (3) Promoting diversification programs

based on economic potential. The industrial irrigation land in NTT in 2014 reached 127,308 ha, while non-technical, including dry land in NTT, reached 2,379,005 ha. The land use of wetlands has only reached 52%, while dry land has only reached 65.41%. Increasing rice production in NTT is still very possible. BPS (2018) [28] recorded a temporary figure of lowland rice production in NTT for 2015 of 948,088 tons of MPD, while the fixed data in 2014 were 825,728 tons of MPD (an increase of 14.82 percent). This increase was due to increased harvested area and productivity by 7.90 percent and 6.41 percent.

The low utilization of irrigation potential in NTT, in general, is closely related to the lack of technical and financial capacity and the lack of community motivation. It is exacerbated by the low management of irrigation maintenance in some areas, which causes the irrigation potential to be significantly reduced. Weak coordination across sectors in the regions needs to be fixed immediately. It is often found in 1 village, and more than two food programs involve the same community groups. Still, there needs to be integration because different institutions carry them out with different interests, and the desired targets are often sectoral and temporary. Higher Education has a strategic position that can facilitate the coordination of these programs because Higher Education is a neutral institution with sufficient human resources and quantity with a diverse scope of scientific fields. The partnership pattern between the Government-Higher Education-Business World- The community- NGOs (non-government organizations) needs to be intensified[21].

4. Conclusions

The problems faced in the food security sector that need to be addressed are stability, availability, sustainability, and accessibility cases. The stability problems are: high vulnerability to floods, landslides, extreme weather disasters, and drought, low capture/aquaculture production, low production of poultry/livestock, consumption of sereralia is higher than production in the district/city, a small percentage of the area of paddy fields, garden, ground to the area, and a low ratio of irrigated paddy to total paddy area. The availability problems are low productivity of lowland rice, dry rice, corn, green beans, peanuts, soybeans, cassava, and sweet potatoes. The sustainability problems are a small percentage of household food crops, aquaculture, and capture fisheries, low mastery of agricultural land, high rate of conversion of agricultural land,

high potential of the loafing area, and small livestock and poultry populations. The accessibility problems are the low density of roads, low good road ratio, and elevated villages without permanent or semi-permanent buildings. The average distance of the town to the nearest permanent/semi-permanent market is too far. The local community strategy in dealing with a food vulnerability situation from the hunger risk hunger is to naturally use food that has existed in the past, according to local wisdom.

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