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Investigate factors affecting food security in the province of Nusa Tenggara Barat

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Abstract: The study aimed to analyse factors influencing food security in West Nusa Tenggara province, involving 125 respondents and utilising partial least square (PLS) analysis. Findings revealed: 1) nation culture, farmer's economic condition, distribution, and warehouse service quality significantly affect farmer welfare; 2) farmer welfare positively influences food independence; 3) farmer welfare and food independence positively impact food security; 4) gratitude for farmers moderates the relationship between nation culture and farmer's economic condition on welfare, while farmer's anticipation moderates distribution and warehouse service quality effects on welfare; 5) anticipation does not significantly moderate nation culture and economic conditions' effects on welfare. The study comprehensively examined nation culture, farmer economics, distribution and warehouse quality, gratitude, anticipation, and food independence as food security determinants in West Nusa Tenggara province.

Keywords: farmer welfare; food independence; food security.

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Biographical notes: Muhammad Syafrudin is an Indonesian politician who served as a member of the House of Representatives for three terms (2009–2014, 2014–2019, and 2019–2024). For the third period, he represented the electoral district of West Nusa Tenggara I, which includes West Sumbawa Regency, Dompu Regency, Sumbawa Regency, Bima Regency and Bima City. Syafrudin is a cadre of the National Mandate Party. Currently, he serves in Commission IV.

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1 Introduction

Food is the most basic need that must be owned by every human being. Therefore, the fulfilment of food is the most basic human right where its fulfilment is the responsibility of the government to its people (Lestari and Mudana, 2020). Fulfilment of food as part of human rights is guaranteed in the 1945 Constitution of the Republic of Indonesia. The provision of food in Indonesia is further regulated in Law No. 18 of 2012, replacing Law No. 7 of 1996 which has been revoked. In Law No. 18 of 2012 explained that the state has natural resources and diverse food sources, so it is obliged to realise the availability, affordability, and fulfilment of food consumption that is sufficient, safe, quality, and nutritionally balanced, both at the national and regional levels to individuals. The Food and Agricultural Organization (FAO) states that what is included in the definition of food are food additives, food raw materials, and other materials used in the process of preparing, processing, and/or making food and beverages.

With food security, it is hoped that the community will be able to realise food self-sufficiency, which means food self-sufficiency. Law No. 18 of 2012 is the ability of domestic food production supported by food security institutions that are able to ensure the fulfilment of sufficient food needs at the household level, both in quantity, quality, safety, and at affordable prices, supported by various food sources according to the with local diversity.

In Guntoro (2019), based on Law No. 18 of 2012, food administration has the objectives of

1 increasing the ability to produce food independently
2 provide food that is diverse and meets the requirements of safety, quality, and nutrition for public consumption
3 realising the level of food adequacy, especially staple food at reasonable and affordable prices in accordance with the needs of the community
4 facilitating or increasing food access for the community, especially for people with food insecurity and nutrition
5 increase the added value and competitiveness of food commodities in domestic and foreign markets
6 increasing public knowledge and awareness about safe, quality, and nutritious food for public consumption
7 improve the welfare of farmers, fishermen, fish raisers, and food business actors
8 protect and develop the wealth of national food resources.

Contents of Law No. 18 of 2012 is to regulate food administration based on the principles of sovereignty, independence, resilience, security, benefits, equity, sustainability, and justice. Dunsire (1978) state that the implementation of food is carried out towards the direction of food sovereignty, food independence, and food security. Food sovereignty is the right of the state to determine food policies that are in accordance with the potential of local resources (Nugroho, 2015). Meanwhile, food independence is the ability of the state to produce food that can guarantee food fulfilment. This food sovereignty and independence can strengthen the achievement of food security, namely the condition of the fulfilment of state food to the individual level which is reflected in the availability of sufficient, safe, diverse, nutritious, equitable and affordable food. Food security is a very complex problem and requires synergies from various sectors, ranging from agriculture, forestry, livestock, marine, trade, and others. The government continues to make various efforts to achieve food security. Food security is also one of the important issues that is the main target in the Sustainable Development Goals (SDGs). Attention to food security is focused on the second goal (zero hunger), namely eradicating hunger, achieving food security and good nutrition, and supporting sustainable agriculture. In Indonesia, food security is also included in the nine priority agendas or Nawa Cita which is the vision and mission of President Joko Widodo. Where food security is one of the three dimensions of development, namely the dimension of leading sector development.

Efforts to realise national food security cannot be separated from the general policy of agricultural development in supporting food supply, especially from domestic production (Anderson, 1979). Within this framework, efforts to realise food security and stability (supply from domestic production) are identical with efforts to increase national food production capacity in agricultural development along with other related supporting policies. the general strategy of agricultural development is to promote agribusiness, namely to build synergistically and harmoniously with the following aspects:

1 upstream agricultural industry which includes seeds, other production inputs and agricultural machinery

2 primary agriculture (on-farm)

3 downstream agriculture industry (product processing)

4 related supporting services.

Given that the main actors in agribusiness are farmers and entrepreneurs, and without income incentives they will be reluctant to pursue agribusiness, the key word in improving the performance of this sector is to create economic incentives that support the attractiveness of agribusiness (Suryana, 2005).

Indonesia has several challenges in terms of food policy (Dunn, 2001). With Indonesia's population which is quite large and continues to grow, the agricultural sector (as a source of producer and main provider of food) is expected to be able to meet a fairly large need for food and continue to grow in quantity, variety and quality. It has become a national policy to fulfil as far as possible the consumption needs of its nation from domestic production, because politically Indonesia does not want to depend on other countries. To that end, the agricultural sector faces quite complex challenges. This challenge also continues to develop dynamically along with social, cultural, economic and political developments. The development of the agricultural sector is also not isolated from the issue of globalisation and the atmosphere of reform and all the dynamics of people's aspirations and changes in the governance structure towards decentralisation (autonomy).

One of the programs initiated to maintain Indonesia's food security in the long-term is the 'food estate' policy (Finaka, 2018). Food estate literally means a food plantation/agriculture company. The food estate program is a food development concept that is carried out in an integrated manner by covering agriculture, plantations, to livestock in an area (Howlett and Rames, 1995). Based on data quoted from kompas.com, food estate is one of the 2020–2024 National Strategic Programs (PSN).

Based on the description above, research related to factors affecting food security needs to be carried out in order to assist the government in formulating policies that can improve food security. This research involves the variables of nation culture, farmers' economic conditions, quality of distribution services, quality of warehouse services, farmers gratitude, farmers anticipation and food independence variables which are defined as the ability of a nation or country to ensure the availability and acquisition of sufficient food, decent quality and healthy (hygienic), and safe. Based on the results of this study, it can be used as a consideration for the government in formulating policies on food in the West Nusa Tenggara area.

2 Literature review and hypotheses development

2.1 Nation culture

Culture is a set of values, perceptions, preferences, and certain behaviours that are obtained from the family environment, religion, nationality, race and geography (Schiffman and Kanuk, 2008). Culture in a certain society (farmers) shape consumer behaviour. Fertiliser products that are marketed must also meet the expectations of the

norms in the farming community. Land is an important means of production for farmers. But not all existing land, can be used to grow the same crops. This is because each region has a different type, structure, soil fertility. This means that farmers in each area must adapt their crops to the existing soil in their area. Not only that, the culture that exists in an area also greatly influences farmers in carrying out farming activities. So the environment and culture have a role in creating an agricultural system in a particular area. And this is what can form an agricultural structure that is different in each region.

Culture is a set of values, perceptions, preferences, and certain behaviours that are obtained from the family environment, religion, nationality, race and geography. This variable is derived into the following indicators.

a tribe/race

b religion/religion

c closeness of social relations

d production purpose.

2.2 Farmers' economic condition

The economic condition referred to here is the economic condition of the family in terms of the economic status or position of the family both in terms of income or one's livelihood in meeting the family needs of the individual concerned. Conditions can be interpreted as a person's condition in a matter. The condition that will be related to this research is the economic condition of a person's family, especially farming families.

There are various kinds of people that we encounter in social life, including some who are rich and some who are poor, some are at a high level of education, some have not been able to get an education, this shows that in social life everywhere, it definitely shows the existence of social strata because there are differences in economic level, education, social status, power. From the explanation of the economic conditions above, it can be concluded that the economic condition of farmers is the high and low social status of farmers based on their position in society based on work to meet their food needs or conditions that describe the position or position of a family in society based on land ownership owned by the community. Farmers, farmer's income and side income which can show the economic condition of the farmer.

Indicators of farmers economic condition, consisting of three factors, namely land tenure, income and secondary income, which are explained as follows:

1 land tenure

2 income

3 side income.

2.3 Distribution service quality yaluran

A product (either in the form of goods or in the form of services) will sell well in the market if the product can be distributed to various places where there are potential buyers. For this purpose, distribution is used to market the product. Place (distribution) is the activity the company undertakes that makes the product available to target customers.

Distribution can be interpreted as a marketing activity that seeks to facilitate and facilitate the delivery of goods and services from producers to consumers, so that their use is as needed (Heryanto et al., 2016).

The context of logistics is synonymous with the organisation, movement, and storage of materials and people. The domain of the logistics activity itself is to provide a system with the right product, at the right location, at the right time (right product, in the right place, at the right time) by optimising the performance measurement provided, for example minimising total operational costs and meeting qualifications provided according to the ability of the client and in accordance with the quality of service (Chandra and Rahardjo, 2013).

2.4 Warehouse service quality

According to Tjiptono and Chandra (2016), service quality is the expected level of excellence and control over these advantages to fulfil customer desires. In other words, there are two main factors that affect the quality of service, the expected service and the perceived service. There are five gaps (gaps) in the quality of services needed in service delivery, the five gaps are:

1 The gap between consumer expectations and management perceptions.

2 The gap between management's perception of customers and service quality specifications.

3 The gap between service quality specifications and service delivery.

4 Gap between service delivery and external communication.

5 Gap between expected service and expected service

2.5 Farmer's gratitude

Gratitude according to Emmons and McCullough (2003) is a form of emotion or feeling, which develops into an attitude, good moral character, habit, personality trait and will ultimately affect a person's reaction to something or situation and can even encourage or motivate someone, where aspects of aspects are feelings such as warm appreciation, goodwill, a tendency to act positively and transpersonally.

Gratitude is one form of behaviour from positive emotions and contrary to the behaviour of anxiety, jealousy, anger and other forms of negative behaviour. This variable is derived into the following indicators.

a sense of appreciation

b positive feeling

c expression of gratitude.

2.6 Farmer anticipation

The anticipatory attitude of farmers can also include the capacity of farmers which are inherent in a person's personality as the main actor in managing agricultural resources to be able to set farming business goals appropriately and achieve the goals that have been

set in an appropriate way as well. The power of farmers in setting and achieving agricultural business goals is measured by knowledge, attitudes and skills.

Farmers as the main actors in managing the farming business need to be able to identify the potential of the farming business, take advantage of opportunities, overcome the problems faced by the farming business and can maintain the sustainability of the farming resources they control (Septarini, 2016). Anticipatory attitudes can also include the independence of farmers in farming which is a manifestation of the freedom of a person as the main actor who relies on the management of agricultural resources to choose and direct matters related to agricultural business activities that are carried out in a mutually dependent, profitable, responsible and accepting manner. all the consequences. This independence consists of aspects of decision making, aspects of capital, partnerships and the dynamics of farming.

2.7 Farmer's welfare

The welfare of farmers is the ultimate goal to be achieved from development in the agricultural sector. This is based on the fact that farmers are the main actors in agricultural development, they should get the right commensurate with what has been devoted to work in agriculture. Mosher (1987) explains that the welfare of farmers is explained from several aspects of household welfare which depend on the level of farmers' income. Farmer's income that is not in accordance with household expenditure will result in the status of the household's standard of living.

In Rambe et al. (2008), welfare is a system of social, material, and spiritual life that is filled with a sense of safety, decency and inner and outer peace that enables every citizen to fulfil the best possible physical, spiritual and social needs for his family and society by upholding the rights of the people human rights and human obligations with Pancasila and the 1995 Constitution. According to the Central Statistics Agency, the level of welfare can be measured using eight indicators, namely:

1 population
2 health and nutrition
3 education
4 employment
5 consumption level and pattern
6 housing and environment
7 poverty
8 other social.

2.8 Food independence

According to Elizabeth (2011), at the national level, food independence is defined as the ability of a nation or state to ensure the availability and acquisition of sufficient food, of decent quality and healthy (hygienic), and safe. This guarantee is based on optimising the use and diversity of local resources. The realisation of food self-sufficiency is reflected,

among others, by micro and macro indicators. Micro indicators are the direct affordability of food by the community and households, while macro indicators are the continuity of food availability, distributed and consumed with balanced nutritional quality, both at the regional and national levels.

2.9 Food security

The World Health Organization (WHO) suggests three pillars of food security, namely food availability, food accessibility, and food utilisation (utility). Food availability concerns the ability of individuals to have a sufficient amount of food for their basic needs. Meanwhile, food accessibility is related to the way a person gets food. Meanwhile, food utility is the ability to utilise quality food ingredients (FAO et al., 2014).

The World Food Summit in 1996 defined food security as when all people continuously, physically, socially and economically, have access to adequate/sufficient, nutritious and safe food that meets their food needs and food choices for an active and healthy life (Safa'at, 2013).

3 Research method

This study uses a quantitative approach. In accordance with the research objectives, this study aims to explain (explanatory or confirmatory), namely to explain the causal relationship between the variables studied through empirical hypothesis testing. Population is the whole group of people, events or things of interest by researchers to be studied. So the population is the entire collection of elements that can be used to make some conclusions. The population in this study includes all organisations and stakeholders involved in food security in Mataram Regency, NTB. The unit of analysis in this study is the organisation. Meanwhile, the sample unit is organisations and stakeholders involved in food security in Mataram Regency, NTB. The sample of this study was taken using a sampling technique, namely proportional random sampling with a total of 125 respondents. Data analysis used the partial least square (PLS) analysis model using the WarpPLS package computer program (Solimun et al., 2017).

3.1 Conceptual model of research

The hypotheses in this study are as follows:

H1 Nation culture significantly affects kesejahteraan petani.

H2 Kondisi ekonomi petani significantly affects kesejahteraan petani.

H3 Kualitas layanan penyaluran significantly affects kesejahteraan petani.

H4 Kualitas layanan gudang significantly affects kesejahteraan petani.

H5 Kesejahteraan petani significantly affects kemandirian pangan.

H6 Kesejahteraan petani significantly affects ketahanan pangan.

H7 Kemandirian pangan significantly affects ketahanan pangan.

H8 Kebersyukuran petani memoderasi pengaruh nation culture terhadap kesejahteraan petani.

H9 Kebersyukuran petani memoderasi pengaruh kondisi ekonomi petani terhadap kesejahteraan petani.

H10 Kebersyukuran petani memoderasi pengaruh kualitas layanan penyaluran terhadap kesejahteraan petani.

H11 Kebersyukuran petani memoderasi pengaruh kualitas layanan gudang terhadap kesejahteraan petani.

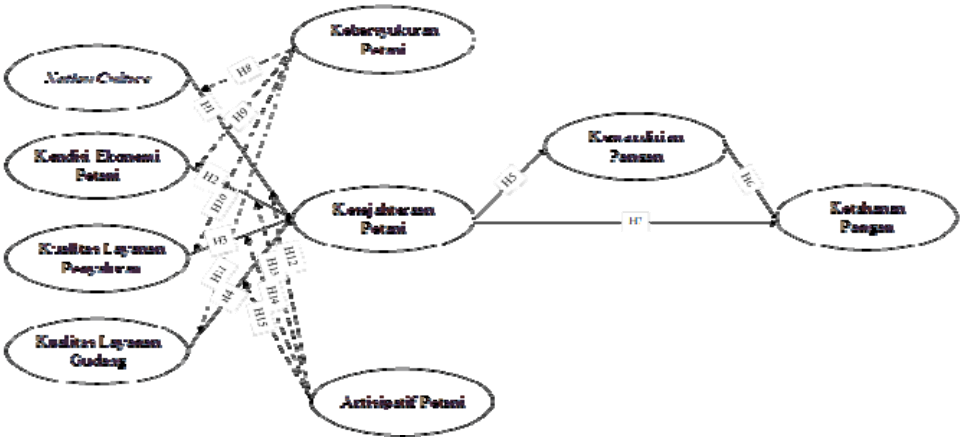
H12 Antisipatif petani memoderasi pengaruh nation culture terhadap kesejahteraan petani.

H13 Antisipatif petani memoderasi pengaruh kondisi ekonomi petani terhadap kesejahteraan petani.

H14 Antisipatif petani memoderasi pengaruh kualitas layanan penyaluran terhadap kesejahteraan petani.

H15 Antisipatif petani memoderasi pengaruh kualitas layanan gudang terhadap kesejahteraan petani.

Figure 1 Conceptual model



4 Result and discussion

4.1 Model measurement

The following is a summary of the average indicator and outer loading of each indicator.

Table 1 confirms that all indicators in this examination are significant. For the nation culture variable (X1), based on the outer loading coefficient, it is found that religion (X1.2) is the main measure of nation culture (X1) because it has the largest outer loading value. That is, nation culture (X1) can be seen from the perception of religion. For the variable economic condition of farmers (X2), based on the outer loading coefficient, it is

obtained that land tenure (X2.1) has a greater value than other indicators. This indicates that land tenure is the main factor that reflects the economic condition of farmers. Warehouse service quality variable (X4), based on the magnitude of the outer loading coefficient, it is obtained that the perceived service (X4.2) is the main measure of warehouse service quality (X4) because it has the largest outer loading value. That is, warehouse service quality is obtained through perceived service. Farmer's gratitude variable (X5), based on the outer loading, it is found that the expression of gratitude (X5.3) is the main measure of farmer's gratitude (X5). Furthermore, self-understanding and the environment (X6.1) is the main measure of the anticipatory farmer variable (X6) because based on the analysis results, the outer model value is the highest compared to other indicators.

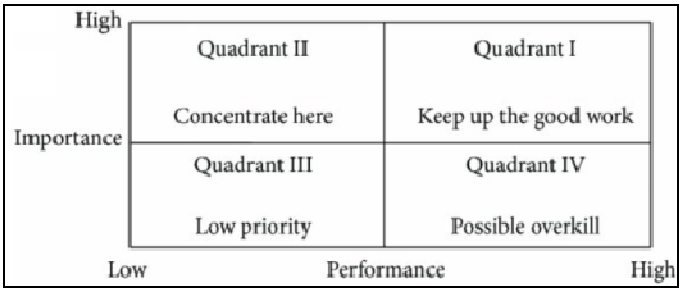
Table 1 Model measurement

Variable	*Indicator*	*Outer loading*	*p-value*
Nation culture (X1)	Tribe/race	0.610	<0.001
	Religious	0.994	<0.001
	Social relations	0.802	<0.001
	Destination	0.890	<0.001
Kondisi ekonomi petani (X2)	Land tenure	0.874	<0.001
	Income	0.604	<0.001
	Side income	0.769	<0.001
Kualitas layanan penyaluran (X3)	Distribution system	1	<0.001
Kualitas layanan gudang (X4)	Expected service	0.604	<0.001
	Perceived service	0.641	<0.001
Kebersyukuran petani (X5)	Sense of appreciation	0.776	<0.001
	Positive feeling	0.887	<0.001
	Expression of gratitude	0.998	<0.001
Antisipatif petani (X6)	Understanding oneself and the environment since childhood	0.842	<0.001
	A person's judgment based on group perception	0.753	<0.001
	Job or organisation entry process	0.635	<0.001
Kesejahteraan petani (Y1)	Economic welfare	0.679	<0.001
	Facility welfare	0.672	<0.001
	Service welfare	0.875	<0.001
Kemandirian pangan (Y2)	Micro independence	0.761	<0.001
	Macro independence	0.706	<0.001
Ketahanan pangan (Y3)	Availability	0.691	<0.001
	Accessibility	0.771	<0.001
	Stability	0.867	<0.001
	Utilisation	0.901	<0.001

Furthermore, the variable of farmer welfare (Y1), based on the outer loading coefficient, it is found that service welfare (Y1.3) is the main measure of farmer welfare (Y1) because it has the largest outer loading value. That is, farmer welfare (Y1) can be seen from the perception of service welfare. For the food independence variable (Y2), based on the outer loading coefficient, it is found that micro independence (Y2.1) has a greater value than the macro independence indicator. This indicates that micro-independence is the main factor that reflects food self-reliance (Y2). Food security variable (Y3), based on the magnitude of the outer loading coefficient, it is obtained that utilisation (Y3.4) is the main measure of food security (Y3) because it has the largest outer loading value. That is, food security (Y3) is reflected through utilisation indicators (Y3.4).

4.2 Importance performance analysis

Figure 2 IPA category



4.2.1 Keterangan

- Quadrant I: Areas where indicators need to be focused. Shows indicators that are actually important but have low performance based on respondents' opinions.
- Quadrant II: Areas where performance indicators need to be maintained. Showing indicators are considered important and their performance has been considered good.
- Quadrant III: Areas where indicators are not prioritised. Indicates that the indicator is considered less important and its performance is considered less
- Quadrant IV: The area where the indicator is considered excessive. Shows that the indicator is considered less important but its performance is considered high.

Based on the table above, the objective indicator (X1.4) is in quadrant 1 (Q1). This means that the goal innovation indicator (X14) is an important indicator and has a high performance in the nation culture variable (X1). Thus, it is possible for these indicators to be considered indicators that need to be maintained for their performance because they are considered important indicators. Meanwhile, religious indicators (X1.2) and social relations (X1.3) are indicators that are in quadrant 2 (Q2). This means that the indicators of religion (X1.2) and social relations (X1.3) are important indicators and have good/high performance, so their performance needs to be improved because of the high level of importance. Furthermore, the ethnic/race indicator (X1.1) is in quadrant 4 (Q4). It can be interpreted that the ethnic/race indicator (X1.1) is an indicator that is less important but

has a high performance, so that the ethnic/race indicator (X1.1) is considered an excessive indicator.

Table 2 Importance performance analysis

Variable	*Indicator*	*Performance*	*Importance*	*Quadrant*
Nation culture (X1)	Tribe/race	0.759	0.610	Q4
	Religious	0.636	0.994	Q2
	Social relations	0.750	0.802	Q2
	Destination	0.960	0.890	Q1
Kondisi ekonomi petani (X2)	Land tenure	0.624	0.874	Q2
	Income	0.803	0.604	Q4
	Side income	0.641	0.769	Q2
Kualitas layanan penyaluran (X3)	Distribution system	0.887	1	Q1
Kualitas layanan gudang (X4)	Expected service	0.950	0.604	Q4
	Perceived service	0.950	0.641	Q4
Kebersyukuran petani (X5)	Sense of appreciation	0.900	0.776	Q1
	Positive feeling	0.692	0.887	Q2
	Expression of gratitude	0.708	0.998	Q2
Antisipatif petani (X6)	Understanding yourself and the environment since childhood	0.611	0.842	Q2
	A person's judgment based on group perception	0.998	0.753	Q1
	Job or organisation entry process	0.683	0.635	Q3
Kesejahteraan petani (Y1)	Economic welfare	0.687	0.679	Q3
	Facility welfare	0.830	0.672	Q4
	Service welfare	0.627	0.875	Q2
Kemandirian pangan (Y2)	Micro independence	0.915	0.761	Q1
	Macro independence	0.983	0.706	Q4
Ketahanan pangan (Y3)	Availability	0.805	0.691	Q4
	Accessibility	0.852	0.771	Q1
	Stability	0.680	0.867	Q2
	Utilisation	0.868	0.901	Q1

In the variable economic condition of farmers (X2), land tenure indicators (X2.1) and secondary income (X2.3) are indicators that are in quadrant 2 (Q2). This means that the indicators of land tenure (X2.1) and side income (X2.3) are important indicators and have good/high performance, so their performance needs to be maintained because the indicators are considered important. Furthermore, the income indicator (X2.2) is in quadrant 4 (Q4). It can be interpreted that the income indicator (X2.2) is an indicator that is less important but has a high performance, so that the Income indicator (X2.2) is considered an excessive indicator.

The distribution system indicator (X3.1) in the distribution service quality variable (X3) is in quadrant 1 (Q1). This means that the distribution system indicator (X3.1) is an important indicator and has high performance in the distribution service quality variable (X3). Thus, it is possible for these indicators to be considered indicators that need to be maintained for their performance because they are considered important indicators.

The expected service indicators (X4.1) and perceived services (X4.2) are in quadrant 4 (Q4). It can be interpreted that the expected service indicator (X4.1) and the perceived service (X4.2) are indicators that are less important but have high performance on warehouse service quality (X4), so the expected Service indicator (X4.1) and perceived service (X4.2) is considered an excessive indicator.

The sense of appreciation (X5.1) indicator is in quadrant 1 (Q1). This means that the innovation sense of appreciation indicator (X5.1) is an important indicator and has high performance in the variable of farmer gratitude (X5). Thus, it is possible for these indicators to be considered indicators that need to be maintained for their performance because they are considered important indicators. Meanwhile, positive feeling indicators (X5.2) and expression of gratitude (X5.3) are indicators that they are in quadrant 2 (Q2). This means that the indicators of positive feelings (X5.2) and expression of gratitude (X5.3) are important indicators and have good/high performance, so their performance needs to be improved because of the high level of importance.

In the anticipatory farmer variable (X6), the indicator of a person's assessment based on group perception (X6.2) is in quadrant 1 (Q1). This means that the innovation indicator of a person's assessment based on group perception (X6.2) is an important indicator and has high performance. Thus, it is possible for these indicators to be considered indicators that need to be maintained for their performance because they are considered important indicators. Meanwhile, the indicator of self-understanding and the environment since childhood (X6.1) is an indicator of being in quadrant 2 (Q2). This means that the indicator of self-understanding and the environment since childhood is an important indicator and has a good/high performance, so it is necessary to improve its performance because of the high level of importance. Furthermore, the organisational entry process indicator (X6.3) is an indicator that is in quadrant 3 (Q3). This means that the organisational entry process indicator (X6.3) has a low level of importance and performance, so it is an indicator that is not prioritised.

Service welfare indicator (Y1.3) is an indicator in quadrant 2 (Q2). This means that the service welfare indicator (Y1.3) is an important indicator and has a good/high performance, so it is necessary to improve its performance because of the high level of importance in the farmer welfare variable (Y1). Meanwhile, the economic welfare indicator (Y1.1) is an indicator that is in quadrant 3 (Q3). This means that the economic welfare indicator (Y1.1) has a low level of importance and performance, so it is an indicator that is not prioritised. Furthermore, the facility welfare indicator (Y1.2) is in quadrant 4 (Q4). It can be interpreted that the facility welfare indicator (Y1.2) is an indicator that is less important but has high performance, so that the facility welfare indicator (Y1.2) is considered an excessive indicator.

In the Food Independence variable (Y2), the micro independence indicator (Y2.1) is in quadrant 1 (Q1). This means that the indicator of micro independence innovation (Y2.1) is an important indicator and has high performance. Thus, it is possible for these indicators to be considered indicators that need to be maintained for their performance because they are considered important indicators. Furthermore, the macro independence

indicator (Y2.2) is in quadrant 4 (Q4). It can be interpreted that the macro independence indicator (Y2.2) is an indicator that is less important but has high performance, so that the macro independence indicator (Y2.2) is considered an excessive indicator.

Indicators of accessibility (Y3.2) and utilisation (Y3.4) are in quadrant 1 (Q1). This means that the indicator (Y3.2) and utilisation (Y3.4) are important indicators and have high performance in the food security variable (Y3). Thus, it is possible for these indicators to be considered indicators that need to be maintained for their performance because they are considered important indicators. Meanwhile, the stability indicator (Y3.3) is an indicator in quadrant 2 (Q2). This means that the stability indicator (Y3.3) is an important indicator and has a good/high performance, so it is necessary to improve its performance because of the high level of importance. Furthermore, the availability indicator (Y3.1) is in quadrant 4 (Q4). It can be interpreted that the availability indicator (Y3.1) is an indicator that is less important but has high performance, so that the availability indicator (Y3.1) is considered an excessive indicator.

4.3 SEM analysis

The results of the direct effects are presented in Table 3.

H1 Nation culture significantly affects farmer's welfare.

Table 3 shows that the impact of nation culture (X1) on farmer welfare (Y1) acquired a primary coefficient of 0.326 and p-value < 0.005. Since the p-value < 0.05, and the coefficient is positive, it shows that there is a critical and beneficial outcome between nation culture (X1) on farmer welfare (Y1). This implies that the higher the nation culture (X1), the higher the peasant welfare (Y1) esteem. Consequently, Hypothesis 1 of this review is acknowledged.

H2 Farmer's economic condition significantly affects farmer's welfare.

The impact of farmer's economic condition (X1) on farmer's welfare (Y1) got an underlying coefficient of 0.366 and a p-value of < 0.001. Since the p-value < 0.05, and the coefficient is positive, it demonstrates that there is a critical and positive impact between nation culture (X1) on food security (Y2). This implies that the higher the nation culture (X1), the higher the food security (Y2) esteem. Consequently, Hypothesis 2 of this review is acknowledged.

H3 Quality of distribution services significantly affects farmer's welfare.

Table 3 shows that the impact of quality of distribution services (X3) on farmer welfare (Y1) acquired an underlying coefficient of 0.3760 and p-value < 0.001. Since the p-value < 0.05, and the coefficient is positive, it shows that there is a huge and constructive outcome between distribution service quality (X3) on farmers welfare (Y1). This implies that the higher the quality of distribution services (X3), the higher the welfare of farmers (Y1) esteem. Along these lines, Hypothesis 3 of this review is acknowledged.

H4 Warehouse service quality significantly affects farmer's welfare.

Table 2 shows that the impact of warehouse service quality (X4) on farmer welfare (Y1) acquired a primary coefficient of 0.4400 and p-value 0.002. Since the p-value < 0.05, and the coefficient is positive, it shows that there is a critical and beneficial outcome between warehouse service quality (X4) on farmer welfare (Y1). This implies that the higher the

quality of warehouse service (X4), the higher the welfare of farmers (Y1) esteem. Consequently, Hypothesis 4 of this review is acknowledged.

H5 Farmer's welfare significantly affects food independence.

Table 3 SEM analysis result

No.	*Variable effect*	*Path coefficient*	*p-value*	*Conclusion*
1	Nation culture towards farmer welfare.	0.3258	0.0054	Sig.
2	Farmer's economic condition towards farmer's welfare	0.3655	0.0002	Sig.
3	Quality of distribution services towards farmer welfare	0.3760	0.0000	Sig.
4	Warehouse service quality towards farmer welfare	0.3407	0.0020	Sig.
5	Farmers welfare towards food independence	0.4400	0.0002	Sig.
6	Farmers welfare towards food security	0.1278	0.2368	Not sig.
7	Food independence towards food security	0.5768	0.0000	Sig.
8	Gratitude for farmers as a moderating influence between nation culture on the welfare of farmers	0.2651	0.0032	Sig.
9	Farmer gratitude as a moderating influence between farmer's economic condition on farmer's welfare	0.2614	0.0146	Sig.
10	Gratitude for farmers as a moderating influence between the quality of distribution services on the welfare of farmers	0.0763	0.4916	Not sig.
11	Gratitude for farmers as a moderating influence between warehouse service quality on farmers' welfare	0.1637	0.1017	Not sig.
12	Anticipatory farmers as a moderating influence between nation culture on the welfare of farmers	0.1002	0.3490	Not sig.
13	Anticipatory farmers as a moderating influence between farmers' economic conditions on farmers' welfare	0.0853	0.3154	Not sig.
14	Anticipatory farmers as a moderating influence between the quality of distribution services on the welfare of farmers	0.2360	0.0260	Sig.
15	Anticipatory farmers as a moderating influence between warehouse service quality on farmers' welfare	0.2099	0.0135	Sig.

Table 2 shows that the impact of farmer welfare (Y1) on food independence (Y2) acquired a primary coefficient of 0.440 and p-value < 0.001. Since the p-value < 0.05, and the coefficient is positive, it shows that there is a critical and beneficial outcome on farmer welfare (Y1) on food independence (Y2). This implies that the higher the Welfare of farmers (Y1), the higher the Food Independence (Y2) esteem. Consequently, Hypothesis 5 of this review is acknowledged.

H6 Farmer's welfare significantly affects food security.

The impact of farmer welfare (Y1) on food security (Y3) got an underlying coefficient of 0.128 and a p-value of 0.237. Since the p-value > 0.05, it demonstrates that there is no impact between farmer welfare (Y1) on food security (Y3). This implies that the higher the welfare of farmers (Y1), will not affect the food security (Y3) esteem. Consequently, Hypothesis 6 of this review is rejected.

H7 Food independence significantly affects food security.

Table 3 shows that the impact of food independence (Y2) on food security (Y3) acquired a primary coefficient of 0.577 and p-value < 0.001. Since the p-value < 0.05, and the coefficient is positive, it shows that there is a critical and beneficial outcome between food independence (Y2) on food security (Y3). This implies that the higher the food security (Y2), the higher the food security (Y3) esteem. Consequently, Hypothesis 7 of this review is acknowledged.

H8 Farmer gratitude moderates the influence of nation culture on farmer welfare.

Based on the results of the analysis on Hypothesis 8, it is obtained that farmer gratitude (X5) as a moderating influence between nation culture (X1) on farmer welfare (Y1) has a coefficient of 0.265 and p-value of 0.003. Due to the p-value < 0.05 and positive coefficient, it can be concluded that farmer gratitude (X5) moderates the effect of nation culture (X1) on farmer welfare (Y1). This means that the gratitude of farmers (X5) strengthens the relationship between nation culture (X1) and the welfare of farmers (Y1).

H9 Farmers' gratitude moderates the influence of farmers' economic conditions on farmers' welfare.

Based on the results of the analysis on Hypothesis 9, it was obtained that farmer gratitude (X5) as a moderating influence between farmer's economic condition (X2) on farmer's welfare (Y1) has a coefficient of 0.261 and a p-value of 0.015. Due to p-value < 0.05 and positive coefficient, it can be concluded that farmer gratitude (X5) moderates the effect of farmer's economic condition (X2) on farmer's welfare (Y1). This means that the gratitude of farmers (X5) strengthens the relationship between economic conditions of farmers (X2) and welfare of farmers (Y1).

H10 Gratitude for farmers moderates the effect of quality of distribution services on farmers' welfare.

Based on the results of the analysis on Hypothesis 10, it is obtained that farmer gratitude (X5) as a moderating influence between distribution service quality (X3) on farmer welfare (Y1) has a coefficient of 0.261 and a p-value of 0.492. Due to the p-value > 0.05, it can be concluded that farmer gratitude (X5) does not moderate the effect of distribution service quality (X3) on farmer welfare (Y1). This means that farmer gratitude (X5) does not strengthen or weaken the relationship between distribution service quality (X3) and farmer welfare (Y1).

H11 Gratitude for farmers moderates the effect of warehouse service quality on farmers' welfare.

Based on the results of the analysis on Hypothesis 11, it is obtained that farmer gratitude (X5) as a moderating influence between warehouse service quality (X4) on farmer welfare (Y1) has a coefficient of 0.164 and p-value of 0.102. Due to the p-value > 0.05, it can be concluded that farmer gratitude (X5) does not moderate the effect of warehouse

service quality (X4) on farmers' welfare (Y1). This means that farmer gratitude (X5) does not strengthen or weaken the relationship between warehouse service quality (X4) and farmer welfare (Y1).

H12 Anticipatory farmers moderate the influence of nation culture on farmers' welfare.

Based on the results of the analysis on Hypothesis 12, it is obtained that the anticipatory farmers (X6) as a moderating influence between nation culture (X1) on the welfare of farmers (Y1) has a coefficient of 0.164 and a p-value of 0.102. Due to the p-value > 0.05, it can be concluded that anticipatory farmers (X6) did not moderate the effect of nation culture (X1) on farmer welfare (Y1). This means that anticipatory farmers (X6) do not strengthen or weaken the relationship between nation culture (X1) and farmer welfare (Y1).

H13 Anticipatory farmers moderate the effect of farmers' economic conditions on farmers' welfare.

Based on the results of the analysis on Hypothesis 13, it is obtained that the anticipatory farmers (X6) as a moderating influence between the economic conditions of farmers (X2) on the welfare of farmers (Y1) has a coefficient of 0.085 and a p-value of 0.315. Due to the p-value > 0.05, it can be concluded that the anticipatory farmer (X6) does not moderate the effect of the economic condition of the farmer (X2) on the welfare of the farmer (Y1). This means that the anticipatory farmer (X6) does not strengthen or weaken the relationship between the economic condition of the farmer (X2) and the welfare of the farmer (Y1).

H14 Anticipatory farmers moderate the effect of quality of distribution services on farmers' welfare.

Based on the results of the analysis on Hypothesis 14, it was obtained that the anticipatory farmers (X6) as a moderating influence between the quality of distribution services (X3) on the welfare of farmers (Y1) had a coefficient of 0.236 and a p-value of 0.026. Due to the p-value < 0.05 and the coefficient is positive, it can be concluded that the anticipatory farmer (X6) moderates the effect of distribution service quality (X3) on farmer welfare (Y1). This means that the anticipatory farmers (X6) strengthen the relationship between the quality of distribution services (X3) and the welfare of farmers (Y1).

H15 Anticipatory farmers moderate the effect of warehouse service quality on farmers' welfare.

Based on the results of the analysis on Hypothesis 15, it was obtained that farmer anticipation (X6) as a moderating influence between warehouse service quality (X4) on farmer welfare (Y1) has a coefficient of 0.210 and p-value of 0.014. Due to the P-value < 0.05 and the coefficient is positive, it can be concluded that anticipatory farmers (X6) moderates the effect of warehouse service quality (X4) on farmer welfare (Y1). This means that anticipatory farmers (X6) strengthen the relationship between warehouse service quality (X4) and farmer welfare (Y1).

In the SEM analysis with the WarpPLS approach, in addition to the results of the direct influence test, the results of the indirect effect test are also obtained. Indirect

influence is an influence that occurs through one or more mediating variables. The results of testing the indirect effect with one mediating variable are presented in Table 4.

Table 4 Indirect influence results

Influence between latent variables			*Path coefficient*	*P-value*	*Conclusion*
Independent var	*Mediation*	*Dependent var*			
Farmer's welfare (Y1)	Food independence (Y2)	Food security (Y3)	0.254	0.003	Significant

Table 4 shows that the indirect effect of farmer welfare (Y1) on food security (Y3) through food independence (Y2) has a significant effect because the p-value is less than 0.05. The results of testing the indirect effect hypothesis indicate that food self-reliance (Y2) acts as a mediating variable between the relationship between the variables of farmer welfare (Y1) and food security (Y3).

5 Conclusions and recommendation

Judging from the results of the research that has been described previously, it can be concluded that:

1 nation culture, farmers' economic conditions, quality of distribution services, quality of warehouse services have a significant positive influence on farmers' welfare.

2 farmer welfare has a significant positive effect on food independence

3 farmer welfare and food independence have a significant positive effect on food security

4 gratitude for farmers moderates the influence between nation culture, and farmer's economic condition on farmer's welfare but not significantly moderated the influence of distribution service quality and warehouse service quality on farmer's welfare.

5 farmers' anticipation moderates the effect of distribution service quality and warehouse service quality on farmer welfare but does not significantly moderate the influence between nation culture, and farmers' economic conditions on farmers' welfare.

The Government of West Nusa Tenggara, Indonesia, needs to improve the welfare of farmers through close social relations with the community in order to increase food self-reliance and security in the province of West Nusa Tenggara. This research contributes to the development of a food security model, especially in the province of West Nusa Tenggara. The theoretical implication in this research is the development of the concept of food security, as well as managerial implications in providing findings and recommendations for the Government of West Nusa Tenggara in increasing food security. In the future, researchers are expected to be able to study on a larger and more comprehensive regional scale, for example in Indonesia.

References

Anderson, J. (1979) *Public Policy Making*, 2nd ed., Holt, Renehart and Winston.

Chandra, A. and Rahardjo, S.T. (2013) *ANALISIS KINERJA DISTRIBUSI LOGISTIK PADA PASOKAN BARANG DARI PUSAT DISTRIBUSI KE GERAI INDOMARET DI KOTA SEMARANG*, Fakultas Ekonomika dan Bisnis, Universitas Diponegoro.

Dunn, W.N. (2001) *Public Policy Analysis: An Introduction*, Pearson Education, Gadjah Mada University Press, New Jersey.

Dunsire (1978) *Implementation Theory, Block 3 Implementation, Evaluation and Change*, Open University.

Elizabeth, R. (2011) 'Strategi Pencapaian Diversifikasi dan Kemandirian Pangan: Antara Harapan dan Kenyataan', *Iptek Tanaman Pangan*, 1 No. 62, pp.230–242.

Emmons, R.A. and McCullough, M.E. (2003) 'Counting blessings versus burdens: an experimental investigation of gratitude and subjective well-being in daily life', *Journal of Personality and Social Psychology*, Vol. 84, No. 2, pp.377–389, https://doi.org/10.1037/0022-3514.84.2.377.

FAO, IFAD and WFP (2014) *The State of Food Insecurity in the World 2014. Strengthening the Enabling Environment for Food Security and Nutrition*, FAO, Rome.

Finaka, A.W. (2018) *Food Estate: Pangan Melimpah*, Harga Lebih Murah. (2017) [online] http://indonesiabaik.id/infografis/foodstate#:~:text=Untuk%20menjaga%0ketahanan%20pangan%20Indonesia,bahkan%20peternakan%20di%20suatu%20kawasan.

Guntoro, H. (2019) *Penerapan UU No. 18 Tahun 2012 Tentang Pangan Belum Maksimal* [online] https://www.gesuri.id/kerakyatan/penerapan-uu-no-18-tahun-2012-tentang-pangan-belum-maksimal-b1WfQZj7X.

Heryanto, M.A., Kusno, K. and Mukti, G.W. (2016) 'Model Sistem Pertanian Padi Organik: Pemberdayaan Petani Skala Kecil (Studi Kasus Desa Sundakerta, Kecamatan Sukahening, Kabupaten Tasikmalaya)', *Agricore: Jurnal Agribisnis dan Sosial Ekonomi Pertanian*, Vol. 1, No. 2, pp.95–204.

Howlett, M. and Rames, M. (1995) *Studying Public Policy, Policy Cycles and Policy Subsystems*, Oxford University Press, Toronto.

Lestari, N.M.A.S. and Mudana, I.N. (2020) 'Implementasi undang-undang nomor 18 tahun 2012 tentang pangan di pasar desa medahan, blahbatuh, gianyar', *Kertha Semaya: Journal Ilmu Hukum*, Vol. 8, No. 4, pp.667–677.

Mosher, A.T. (1987) *Menggerakkan dan Membangun Pertanian: Syarat-syarat Pokok Pembangunan dan Modernisasi*, CV. Yasaguna, Jakarta.

Nugroho, R. (2015) *Kebijakan Publik di Negara-negara Berkembang*, Pustaka Pelajar.

Rambe, A., Hartoyo, H. and Karsin, E.S. (2008) 'ANALISIS ALOKASI PENGELUARAN DAN TINGKAT KESEJAHTERAAN KELUARGA (STUDI DI KECAMATAN MEDAN KOTA, SUMATERA UTARA)', *Jurnal Ilmu Keluarga dan Konsumen*, Vol. 1, No. 1, pp.16–28.

Safa'at, R. (2013) *Rekonstruksi Politik Ketahanan Hukum Pangan*, UBPess, Malang.

Schiffman, L.G. and Kanuk, L.L. (2008) *Consumer Behaviour*, 7th ed., International Edition, Prentice Hall, Upper Saddle River, New Jersey.

Septarini (2016) *AGRIBISNIS: NTB Siapkan 400Ribu Hektar Lahan untuk Tanam Jagung*. Diakses dari [online] https://ekonomi.bisnis.com/read/20161114/99/602320/agribisnis-ntb.

Solimun, Fernandes, A.A.E. and Nurjannah (2017) *Metode Statistika Multivariat Pemodelan Persamaan Struktural (SEM) Pendekatan WarpPLS*, UB Press, Malang.

Suryana, A. (2005) *Kebijakan ketahanan Pangan Nasional. Makalah Seminar disampaikan pada Simposium Nasional Ketahanan dan Keamanan Pangan pada Era Otonomi dan Globalisasi*, 22 November, Faperta, IPB, Bogor.

Tjiptono, F. and Chandra, G. (2016) *Service, Quality & Satisfaction*, Andi, Yogyakarta.