

# Minapadi Development Strategy in Supporting National Food Security

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**Abstract.** Efforts to achieve food security, especially food self-sufficiency, face severe challenges. Intensification needs to be done in optimizing the existing land by applying integrated agriculture. One of them is by integrating agriculture and fishery aspect with implementation of minapadi. Minapadi cultivation has actually grown since a long time, but in the course of time this system began displaced because of pesticides and chemical fertilizers. Become flagship Minapadi back in line with the increasing public awareness of the importance of sustainable environment, health, increasing demand for organic products that are free from pesticide residues which means safe for consumption. Minapadi is the answer to the fulfillment of people's need for carbohydrate and protein food. Blending the fulfillment of carbohydrates is rice as the staple food of most people with the fulfillment of animal protein from fish commodities to add nutritional value. In realizing the food security strategy is required Minapadi development. This descriptive research aims to find out various minapadi development strategies in several regions with different methods based on the literature and previous studies. The result is the formulation of minapadi development strategy in an area not necessarily can be applied in other areas. This occurs because of differences in setting criteria/ variables based on the characteristics and potential of a region, the strengths and opportunities, as well as the weaknesses and threats that the area may encounter.

## 1 Introduction

Law of the Republic of Indonesia Number 18 Year 2012 on Food [1] mandates that states are obliged to realize the availability, affordability, and the fulfillment of adequate, safe, quality and balanced nutritious food consumption, both at the national and local levels to individuals equally throughout the entire territory of the Republic of Indonesia over time by utilizing resources, institutional, and local culture. The definition of food according to the Elucidation of Law of the Republic of Indonesia Number 18 Year 2012, the Food is a basic human need and fulfillment is the most important part of the fundamental right of every Indonesian people. Food should always be available sufficiently, safely, quality, nutritious, and diverse with an affordable price by the community, and does not conflict with religion, faith and culture. In order to achieve this, it should be held a Food system that provides protection for both producers and consuming food.

According to Sularno, et.al, [2], The agricultural sector contributes to food availability and increases food security. Food is a primary need that all the time needed by the community. Therefore, the availability of food must be guaranteed both quantity and quality to meet the needs of the community. Based on the mandate of the

Law of the Republic of Indonesia Number 18 Year 2012 concerning the Food, Food Security Agency, the Ministry of Agriculture in the Strategic Plan of Food Security 2015-2019, prioritizes increasing food sovereignty become a superior program to create economic independence by implementing common policies in RPJMN 2015- 2019, among others, aimed at strengthening food security in order to achieve food self-sufficiency through increased staple food production; improving the quality of food consumption and nutrition; and improving the welfare of food business actors [3]. This is in line with the Strategic Plan of the Ministry of Marine and Fisheries Years 2015-2019 contained in sub agenda Food Sovereignty Increased Fishery Production directed at extensification and intensification of fishery business to realize the creation of food nutrition, and sub agenda of the National Economic Growth Acceleration Through Increased fishery products directed at improving quality, increasing value added and innovation of fishery technology [4].

### 1.1 National food security

The agricultural sector is the foundation for the growth of the national economy. The agricultural sector is

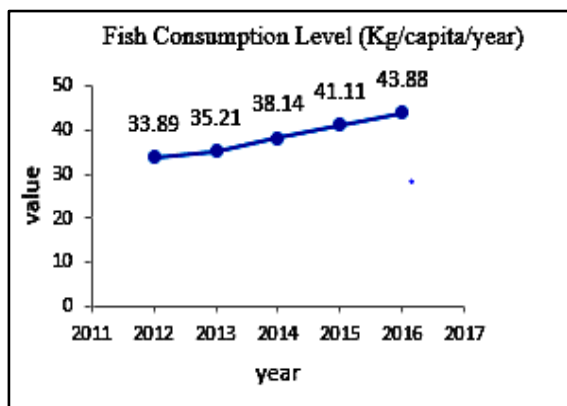
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developed to achieve food security, which is to meet the needs of food and proteins that society needs [2]. Efforts to achieve food security, especially food self-sufficiency face severe challenges due to the availability of land decreases caused by the conversion of agricultural land into residential and industrial. This happens because of the increasing population growth. The increase of Indonesian population from 2010-2015 is 16,942,900 inhabitants [5], while the depreciation of irrigated wetland area of 2011-2015 according to the Ministry of Agriculture [6] is presented in Table 1.

**Table 1.** Irrigated Wetland Area in Indonesia, 2011 - 2015.

Year	Irrigated Wetland Area (Hectares)
2011	9,696,653
2012	9,768,207
2013	9,543,501
2014	9,446,141
2015	9,422,677.4

In addition to the agricultural sector, Indonesia also has a great potential in the fisheries sector. This can be seen from the number of production and market demand is increasing every year. Based on data from the Ministry of Marine Affairs and Fisheries [7], Aquaculture production in 2014 was 14,359,129 tons and increased to 15,634,093 tons in 2015. The level of fish consumption in 2014 amounted to 38.14 kg / capita / year increased to 41.11 Kg / capita / year in 2015. Figure 1 shows the level of fish consumption in Indonesia, from 2012 to 2016 as follows:



**Fig. 1.** Fish Consumption Level, 2012-2016

To overcome the decreasing agricultural land area that is getting lower and fulfill the needs of rice as a staple food and the increasing demand of fish consumption can be done by implementing integrated farming as proposed by Abuasir, et.al, [8], integrating agricultural aspect and fishery aspect with implementation of minapadi cultivation.

## 1.2 Minapadi

Minapadi cultivation has actually grown since a long time, but in the course of time this system is began displaced because of pesticides and chemical fertilizers. Minapadi cultivation is starting to become flagship as the increasing of people awareness of the importance of sustainable environment, health, the increasing demand for organic products are free from pesticide residues means safe for consumption, and after the discovery of pest and disease resistant varieties. [9].

In tropical and sub-tropical Asia, minapadi systems constitute a unique agro-landscape. In food security and global change, minapadi is one of the important supporting factors because minapadi produce food sources of carbohydrates and proteins and in economic terms can reduce the risks that may be faced by farmers. In this integrated ecosystem, there is a symbiotic mutualism between rice and fish. As the water temperature increases, the rice provides shade for the fish, and the decaying leaves are very useful for fish feed. On the other hand, fish can increase fertility and reduce pests of disease that attack rice plants [10]. The results of Nurhayati, et.al, [11], concluded that minapadi have economic and social value for the community in terms of optimizing land use. The objective of minapadi implementation is to supports the increasing of soil productivity, increasing farmer's income, improving food quality for the community. Long DN, et.al, [12] in his research mentioned that an integrated agricultural processing between fish and rice help farmers generate more income. Extra income can only be achieved if the system is integrated farming, diversification and production efficiency. The results of his research in the Mekong delta illustrates the net income of farmers who apply minapadi system is higher than the farmers who apply monocultures. In another study, Bobihoe J, et.al, [13] states that through Integrated Crop Management (ICM) is more provitable compared with the non ICM due to perform integrated crop management can increase production by 50%. Minapadi system is also very beneficial because it can increase the production of grain and straw [14]. According to the Ministry of Marine Affairs and Fisheries, 2017 [15] in one hectare of farmland can earn 72 million rupiah per year in the form of rice as much as 7-8 tons per cycle, and additional fish production as much as 1.5-2 tons per cycle. This means that farmers will get a 50% added value of income compared to before applying minapadi.

Therefore, the review and analysis of minapadi in Indonesia is very important. In this paper will provide an overview of how minapadi development strategies in various regions in Indonesia in supporting national food security.

## 2 Methods

In this paper used the descriptive method to describe minapadi development strategies in various regions in Indonesia. There are three types of methods used to

formulate minapadi development strategies, the SWOT analysis, AHP, and A'WOT.

### 3 Results and discussion

Research on minapadi development strategy in various regions in Indonesia have been carried out by the method and the different variables, which are summarized in Table 2.

**Table 2.**Minapadi Development Strategy Research in Indonesia

Author	Sularno, et. al. (2014)	Nuryasri S, et. al. (2015)	Cahyaningrum W, et.al. (2014)
Location	Soropadan village, district. Pringsurat, Temanggung	Village A. Widodo, district. Tugumulyo, MusiRawas	Cianjur, West Java
Method	SWOT	AHP	A'WOT
Results	a. Improve quality and production according to market demand. b. Establishing institutional market c. Applying farming greener and handling of product yield	Election implementation of species of fish in minapadi, the priority application of catfish from the tilapia or carp	a. Creating the cooperation of farmers and groups, open access to capital b. Implementing utilization policy space pattern consistent c. Conducting water quality management & use of resistant fish d. Improving the coordination of making cheap / economical feed/ providing quality seeds

According Sularno et al, [2] SWOT method used taking into account the internal and external factors that support and hinder efforts minapadi. Maximizing strength (S) and opportunities (O) and minimize weaknesses (W) and threats (T) of the business minapadi known through market surveys, interviews and observations. The strength of minapadi businesses in the village Soropadan include: irrigation, food availability, time of harvest and nutritional value of fish. Weaknesses become an obstacle, namely: the use of chemicals, sorting and grading treatment, to determine the price at the producers / market, level, and nature of perishable fishery products. Identification of external factors such as opportunities that include: high demand for rice and fish, access to juvenile fish and the high price of fish, while the factors that threaten minapadi business is rice plant pest and predator fish. In the preparation of the strategy is done by making a SWOT matrix that

illustrates clearly how the opportunities and threats faced and combined with the strengths and weaknesses, so as to produce alternatives strategies as shown in Table 2.

Based on research conducted by Nuryasri S, et al, [16], the method used is AHP (*Analysis Hierarchy Process*).The data collection was done by using a structured interview using a questionnaire and literature from agencies or institutions. There are four criteria used in this study, namely production, revenue, marketing and third party support. Each of these criteria is divided into sub-criteria, which consist of: a). production: capital, labor, rice seeds and fish seed, land, pests and diseases; b). revenue: selling price, total costs and revenues minapadi; c). marketing: market segmentation and cooperation with institutions; and d). 3rd party support: Field Extension Officer, and other related agencies.

Research on minapadi development strategy by using a blend of SWOT method with AHP or A'WOT method performed by Cahyaningrum W, et.al, [17]. The data collection is done by means of a literature study and interviews. The process carried out consisted of two phases. The first step is the identification of SWOT factors that include internal factors (strengths and weaknesses) and external factors (opportunities and threats). The second stage of the weighting and rating of each of the internal and external factors. Based on the SWOT matrix, the position of Cianjur regency fisheries are in quadrant II so it is necessary to apply the strategy ST(*Strength-Threat*)as the most appropriate strategy, namely to minimize the threat faced by utilizing all the existing strength. The criteria in determining the strengths, opportunities, weaknesses and threats as follows: a). power: the potential of natural resources, fish farming techniques, manpower, availability of fish production facilities and infrastructure, national and local governments policy support, and a group of fish farmers; b). opportunities: public awareness of nutrition, demand for fish, near the area of marketing (Bandung, Jakarta, Bogor), potential food producer, wide price range, non-formal education; c). weakness: quality of mains and fish seeds, fish processing business, markets / depots fish, quality of human resources and groups, coaching and *supporting* apparatus to cultivators, and interests of the younger generation; d). threat: fish feed prices, declining water quality, land use and water conflicts, low capital capability, access to complex capital, and competition with other regions.

Based on the methods used in the study, the SWOT method is the most appropriate method in the formulation of minapadi development strategy, because this analysis can formulate the best alternative that helps to achieve the goal, and according to David FR, 2009 [18], states that the integration of the 3 stages in decision making is the most important strategy formulation technique. The stage consists of :a). input collection stage in the form of collecting information needed in determining the strategy, b). a matching stage that creates a reasonable alternative strategy with regard to internal and external factors, c). decision stage that gives priority strategy that must be done first. Therefore, this method can help identify, evaluate and select strategies. In addition, research on minapadi development strategy

is limited to the internal and external environment that affect the group and Analysis of internal and external factors of groups in providing alternative minapadi development strategies. While research with AHP method has weakness among others dependence on the main-input. In the form of subjectivity from the perception of an expert so if the expert gives a wrong assessment, the model becomes meaningless. In addition, this AHP method has no confidence limits from the correctness of the model that is formed because it is a mathematical method without any statistical test [19].

## 4 Conclusion

There are different minapadi development strategies implemented in various regions in Indonesia. This happens because of differences in setting criteria / variables based on the characteristics and potential of a region, the strengths and opportunities, and the weaknesses and threats that the region might face. So the formulation of minapadi development strategy in an area not necessarily can be applied in other areas

## References

1. *Undang-Undang Republik Indonesia Nomor 18 Tahun 2012 Tentang Pangan*. 2012.
2. Sularno, S. Jauhari, *SEPA*. **10**(2):268–74, (2014)
3. *Kementan RI. Rencana Strategis Badan Ketahanan Pangan Tahun 2015-2019*. 2014;
4. *KKP RI. Rencana Strategis Kementerian Kelautan dan Perikanan Tahun 2015-2019*. 2015;
5. BPS. *Badan Pusa tStatistik*, Jakarta. (2014) [cited 2017 Jul 1]. Available from: <https://www.bps.go.id/linkTabelStatis/view/id/1274>
6. Kementan RI. *Kementerian Pertanian RI*. (2016) [cited 2017 Jul 1]. Available from: <http://prasarana.pertanian.go.id/lahanmy/>
7. KKP RI. *Produksi Perikanan Budidaya* (2017) [cited 2017 Jul 1]. Available from: <http://statistik.kkp.go.id/sidatik-dev/2.php?x=3>
8. S. Abuasir, N. Hakim, Y. Sumitro. *J Komun. dan Pengemb. Masy.* **1**(1):30–7, (2004)
9. Sutanto R. *Penerapan Pertanian Organik: Pemasyarakatan dan Pengembangannya*. Yogyakarta: Kanisius; (2002).
10. J. Lu, X. Li, *Aquaculture*; **260**(1–4):106–13. (2006)
11. A. Nurhayati, W. Lili, T. Herawati, I. Riyantini. *AquatProcedia*. **7**:12–8, (2016)
12. Long DN et. al. *Experiment on an Integrated Ricefish Polyculture System ( 6 Species , 1 – 2 fish / m 2 ) in the Mekong Delta*.140–50, (2002)
13. Bobihoe.J et. al. *J Lahan Suboptimal*. **4**(1):47–56, (2015)
14. M.T.H. Chowdhury, S. Dewan, M.A.Wahab, S.H. Thilsted, *Bangladesh J Fish Res*. **5**(2):115–22, (2001)
15. KKP RI. *Kebijakan KKP Pada Subsektor Perikanan Budidaya Kementerian Kelautan dan Perikanan RI*. 2017
16. Nuryasri S. et al. *AGRISEP*. **14**(1):66–78, (2015)
17. Cahyaningrum W et. a. *Maj Ilm Globe*. **16**(1):77–88, (2014)
18. F.R. David, *Manajemen Strategis : Konsep. Kedua belas*. Salemba Empat, Jakarta; (2009).
19. Fitria. *J Inform*. **13**(1):10–22, (2013)