

## 学位論文要旨 Dissertation Abstract

氏名 : Andi Patiware Metaragakusuma  
Name

学位論文題目 : An Analysis on the Development of Sago Production and Its  
Determinants in South Sulawesi, Indonesia  
Title of Dissertation (インドネシア、南スラウェシにおけるサゴ生産の発展およびその影響要因に関する研究)

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The high dependency on rice as a staple in Indonesia has resulted in large quantities of rice imports; the National Research Council of Indonesia noted that in the 1990s rice imports averaged two million tons per year. This situation posed a threat to national food security. Considering the potential of sago palm in Indonesia and the nutrient content of sago, particularly its carbohydrate content, sago is one alternative local food available for food diversification. In addition, the experiences of local people in consuming sago have shown that sago has wider uses. Preparing sago for various products is not something new for rural Indonesian people, who have the basic capability to acquire adequate sago as a staple food.

Sago became popular as an alternative food for food diversification after the government issued two policies, Presidential Decree No. 22/2009 and Regulation of the Minister of Agriculture No. 43/ 2009 which emphasized reviving local resources. This was followed by the statement from the Ministry of Agriculture that sago has a great potential to be developed because it has a high carbohydrate content (Metaragakusuma, 2015).

Even though some researchers have worked on increasing the utilization of sago and its development in some sago producing areas in Indonesia, such as Sumatra where the sago industry is growing rapidly, and Papua where sago palm is growing wild, very few researchers have investigated it in South Sulawesi. There exists a small area of sago palm (that may disappear) which still plays an important role as the main food source for some members of the local population and has potential for development. Although the sago plant is a part of the history and culture of South Sulawesi, until now sago is still not treated as a priority crop.

Before investigating sago development in South Sulawesi, our research first examined what are the traditional uses of sago for the sago-based food industry in Indonesia. It was found that sago is an important ingredient in a variety of products that have a high potential to be developed further for wider acceptance by consumers, especially in processing efforts in the food industry sector. Because of its importance as a raw material for the production of some processed food items (eg *kapurung*), if demand for sago does, as predicted, will increase in the future, the availability of raw sago starch in the future may become a challenge to expanding production (Metaragakusuma et al., 2016).

Furthermore, our study investigated the current status of sago production in South Sulawesi including its market status and challenges as a new food-industry source. It shows that sago production is considered low and in this 8 year period (2006 – 2013) was decreased by 86%. To increase the production, potential sago palm areas should be cultivated. If it is utilized optimally, sago can be harvested at a yield of 20 tons per hectare per year. In terms of market status, a market for sago exists and the sales trend showed an increase, sago has market potential not only inside but also outside of the sago production areas and there is a possibility to further expand the area of sago market. The sustainability of sago will determine the existence of sago-based food industries in the future. What needs to be done is the optimization of sago potential, so sago production can be increased. Besides that, in order to anticipate the future needs of sago, sustainable processes should be implemented, first by planting more sago seedlings (Metaragakusuma et al., 2017a).

For further investigation, the different factors affecting sago producing farm households (SFHs) using production in the biggest sago producing area in South Sulawesi, Luwu Utara Regency, were examined. Statistical independent t-test analysis was used to investigate factors contributing to differences among SFHs' production of sago. The three most important factors in sago production were identified: working hours, income, and motivation. It makes sense that working hours can impact income; it has been proven by many researchers that working hours and income are directly proportional. However, there is an interesting finding in this study, which is that a farmer's motivation is one of the most important factors. It can be concluded that motivation can influence the number of hours of a SFH works. Undeniably, motivational training and support from related stakeholders can encourage a sago farm household (SFH) to achieve a better livelihood. (Metaragakusuma et al, 2017b).

Departing from the current status of sago development in South Sulawesi, it is important to review the past condition for sago development in South Sulawesi. Obviously, that situation can be a platform for sago development in the future. Through a literature study and in depth interviews, many initiatives have been conducted in the past; (1) a project for improving sago production through factory building and improved processing in 1985, (2) the planting of 100 sago trees followed by promotion and campaigning on the importance of sago with the slogan "*Ayo Menanam Sago* (let's plant sago)" in 2010, and (3) the planting of 200 sago trees to encourage local people to preserve sago palm in 2012. However, these activities are considered failures because of a lack of continuity; consequently planting sago did not take off; to local people, planting sago is still uncommon and it is better to plant other cash crops, and also because these activities were conducted independently; activities like planting and harvesting sago require collaboration with related stakeholders.

Highlighting the failed initiatives for sago development in the past, plus the results of previous studies, leads to the conclusion that sago development in South Sulawesi is difficult. There is no comprehensive framework or clear strategy related to sago development in South Sulawesi. Why is it so difficult? The simple answer is because of the size of the sago plant; the plant is much bigger than the human body, so cultivation is impossible for one person; teamwork is a must.

The intensive process of developing a framework for sago development through teamwork has started with the sago rehabilitation project, a project funded by Japan Society for the Promotion of Science (JSPS). The aim of this project is to protect and rehabilitate sago palm forests, while at same time meeting the socio-economic development for sustainable management of the ecosystem. The prospects for this project look promising, and it could be the start of a new era for better sago development in South Sulawesi.

The triple helix model of UIG (university-industry-government) is applied as a framework to the concept Sago Techno Park in the JSPS project. This model is a commonly used model as a framework for regional development, but in the context of sago development in Tana Luwu, the local community is no less important than the other participants mentioned above. As a form of adaptation strategy for better sago development, the community should be involved. In this project, social adaptations will be developed to create society forest co-existence by using sago palm in the proposed new social model.

To accommodate the community as the forth helix, the framework of a quadruple helix is preferred, that is, a collaborative approach by four stakeholders: academia (A), business (B), community (C), and government (G). All helices stand equally as main actors. For instance, in technology transfer, the community not only obtains knowledge from academics, but also contributes through planting sago, research support, and information transfer related to local wisdom, culture, and the legacy of generations of sago use. The community can also be a partner in the sago business and businesspeople can have the opportunity to develop local small and medium industries and, if necessary, open collaboration systems with other countries can be established to obtain advanced skills and develop human resources. In addition, the community is important for supporting the government in implementing programs related to sago development. Government actions in determining the legal framework, by providing the necessary seedlings funding for sago production adoption and by facilitating access to suitable land, are key to front-line efforts addressing the implementation of sago development.