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Improving the Innovation of Appropriate Technology in the Home Industry of *Pemindangan* in Coastal Communities of Tambaksari Village

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Abstract:

The purpose of this research is to analyze the improvement of appropriate technology innovation in home industry of *pemindangan* in coastal community of Tambaksari Village. The research method used is qualitative with case study approach. The subjects of the research were the home industry of *pemindangan*, while the informant was the Tambaksari community and the consumers of pindang fish. The method of data collection used observation, indept interview and documents. Data validity technique used data triangulation and data analysis technique used nvivo data analysis technique. The results showed that there was an increase in production quality in home industry of *pemindangan* using precise technology *pan presto pindang pangkon*. The production process becomes time-saving, cost-effective and energy-efficient, in addition to the more hygienic production process and the result of pindang fish is more durable. The benefits are increasing to improve the life quality of *pemindangan* home industry shoppers. The conclusion is that *pindang pangkon* is one of the appropriate technological innovations that can be used in home industry of *pemindangan.*

Keywords: Home Industry; *Pemindangan*; Coastal Communities; Tambaksari Village.

JEL Classification: Q22; F64; Q55.

Introduction

The topography of Kendal Regency covers oceans, lowland, high land and large water sources which has the potential of fishery resources is quite promising. In fisheries there are two activities of catching fish. The first is fishing in the sea and second fishing in public waters as well as in fishery ponds and freshwater fisheries. The fishing area of Kendal Regency covers the waters of the North Coast of Java that stretches along ± 42.4 km,

covering 7 districts, namely Kaliwungu, Brangsong, Kendal, Patebon, Cepiring, Kangkung and Rowosari. The residents' livelihoods in fisheries are as many as 16,612 active fishermen, consisting of 14,902 *pendega* or employees on fishing vessel, 1,710 as many as the owner of the vessel, and 79 resellers. Meanwhile, there four marketing center for fishery in Kendal Regency which consisting of four are of Fish Auction Market (TPI) namely TPI Tawang in Rowosari District, Sendang Sikucing Team in Rowosari District, Bandengan TPI in Kendal District and TPI Tanggul Malang, Pidodo Kulon in Patebon District.

One effort to preserve fishery products so that they are not damaged and rotten is by processing fish (Asus and Sukandar 2009). In general, coastal community processes fish in traditional ways such as *pemindangan* (to salt fish but without drying them), fumigation, salting, and drying. On the industrial scale the type of fish processing is done by freezing. Various types of fish which are processed are *layang* fish, *selar, japu*, *tembang* fish, *lemuru,* mackerel, tuna, skipjack, and *tongkol*. Rowosari sub-district is one of the biggest fish processing sub-districts in Kendal Regency. The following is the list of processed fish products produced by the community in Rowosari (Dinas Kelautan dan Perikanan Kab. Kendal 2014)

Table 1. Type of Processing, Number of Labor and Marketing of Processed Fish in Rowosari District, Kendal District, 2014

Village	Type of Processing	Total Labor	Marketing
Tambaksari	*Pemindangan*	348	Sukorejo, Kendal, Parakan, Temanggung, Magelang, Banjarnegara, Pemalang, Yogyakarta, Purbalingga dan Purwokerto
Tanjungsari	*Pemindangan*	467	
	Pengasapan	41	
Tanjunganom	*Pemindangan*	18	
Rowosari	Processing of salted fish	14	
Jatipurwo	Processing of salted fish	12	
Gempolsewu	Processing of salted fish and shrimp paste	52	
Sendang Sikucing	Processing of salted fish and shrimp paste	36	

Based on the above table, one of the villages in Rowosari Sub-district that produces processed fish is Tambaksari Village. In Tambaksari Village, the type of fish processing done by many people is by *pemindangan*. *Memindang* is one effort to preserve and process fish using technical salting and boiling. Processing is done by boiling / heating the fish in a salty atmosphere with a certain time in a container called *badeg.* This *badeg* is used as a fish spot during boiling / heating as well as used for packaging during transportation and marketing (Adrian 2013; Fauziah *et al*. 2014). The types of fish that are processed by *pemindangan* are tuna, *banyar* and *selar* (Giyah and Bambang 2015). The advantage of *pindang* fish than the other fish processes is that *pindang* fish has a taste that is more delicious and it is not so salty, therefore it can be consumed in large quantities. *Pindang* fish is processed fish that are ready to eat and all types of fish can be processed into *pindang* fish. But because of the limited quality and durability of processed products due to the conventional and simple equipment so that the production of processed *pindang* fish in Tambaksari Village is marketed on a limited area. To improve the marketing, appropriate technology to lengthen the processed fish durability is needed.

Appropriate technology is a technology that suits the needs of the community, can answer the problems of society, do not damage the environment and can be utilized by the community easily and generate added value from economic aspects and environmental aspects. The objectives of appropriate technology are to accelerate economic recovery, improve and develop community businesses of productive economic activities, expand employment, provide more business field, improve productivity and quality of production. The target is any member of the society that has small or medium enterprises that in the development process of their business requires appropriate technology. The scope of appropriate technology application is done by providing hardware, software, capital for community groups/individuals who have small and medium enterprises to improve their business. The principles are to improve the community economic businesses, to develop entrepreneurship, must to provide activities which give sustainable and economical benefits. Participatory approaches is used by considering regional potentials, program integrity, bottom-up planning and using he existing and successful institutions and mechanisms in the region (Instruksi Presiden Republik Indonesia 2001).

The appropriate technology that is given to the *pemindangan* home industry in Tambaksari village is in the form of providing them with *pindang pangkon* tool. This is a tool that can be used to process *pemindangan* fish fast, hygienic and easy. So the process of *pemindangan* is more effective and efficient.

1. Methodology

The research method used qualitative method with case study approach to study about the utilization of appropriate technology innovation in *pemindangan* home industry in coastal communities Tambaksari Village. Research location in Tambaksari Village, Rowosari District, Kendal Regency. The research time is conducted from 2016 until 2018. The subject of research is determined based on the topic of study to be studied, namely the *pemindangan* home industry in Tambaksari Village of 54 people, consisting of IR 1 persons 1 person, IR 2 players and 50 IR 3 of 5 people. While the informants are 18 people, consisting of 10 people, Fisheries and Fisheries Department of Kendal District, 1 person, Tambaksari Village Chief, Tambaksari Village Secretary and Tambaksari Village, 5 people. Data collection includes primary data and secondary data. Primary data sources were obtained from research subjects and informants. While the secondary data obtained from the report / publication of the relevant agencies and supporting data in the Village Hall Tambakasari. Data collection techniques used are observation, in-depth interviews (conducted to obtain data from IR actors), Focus Group Discussion (FGD) (conducted to obtain data from informants), documents and questionnaires.

The technique of data validity using data triangulation. Triangulation is a combination or a combination of methods used to examine interrelated phenomena from different perspectives and perspectives.Data analysis techniques using nvivo, ie by using software commonly used for qualitative research. This is done with the aim of exploring and understanding the data in more depth and to summarize the data and integrate it in an easy-to-understand analysis flow.

2. Result and Discussion

Tambaksari Village is one of the villages in the coastal area of Rowosari District, Kendal Regency. Coastal areas have abundant natural resources (Roslinawati 2013; Sihasale 2013). Although Tambaksari Village is located in the coastal area, but the none of the community is whose livelihood is as a fisherman. Of the 2,206 people, 1,205 people work in the fish processing industry, and 348 of them work in *pemindangan* home industry (Badan Pusat Statistik 2015).

a. Overview of *Pemindangan* Home Industry in Tambaksari Village

The Home Industry (IR) is a production system that produces a product through the process of generating added value from certain raw materials, which is done at home and not in a special location (such as a factory), and uses simple production tools (Peraturan Menteri Pemberdayaan Perempuan dan Perlindungan Anak Republik Indonesia, 2016). *Pemindangan* Home Industry (IR) is a small-scale indusrty i.e. household scale, with less than four people workforce. The characteristics of IR are very limited capital, labor comes from family members, and the owner of the industry is usually the head of the household or a member of his family. IR of *pemindangan* is one of the excellent potential of Minapolitan Tourism Village in Tambaksari Village. All of this time IR activity is managed by the Department of Marine Affairs and Fisheries of Kendal Regency. The IR practitioners in Tambaksari Village are divided into several business level categories. Among them is the category of entry level business (IR 1) 1 person, developing (IR 2) as many as 310 people and advanced (IR 3) as many as 37 people. Each IR has its own characteristics, as seen in the following Table 2.

Table 2. Characteristics of the Home Industry

Category of Business Level	Total (IR)	Labor (Person)	Production Technology	Source of Business Capital	Total Capital (Rp)	Business Duration (Year)	Pattern of Production
Beginner (IR 1)	1	1-2	Manual	Own	< 5 million	< 1	Not Continuous
Growing (IR 2)	310	3-5	Semi Manual/ simple technology	Own, Loans from LKM non-formal	5 million - < 25 million	1-2	Semi Continuous
Advance (IR 3)	37	6-10	High technology	Own, Loans from LKM Formal	25 million - < 50 million	> 2	Continuous

IR of *pemindangan* has its own problems in the development of its business, including as seen in the Table 3.

Table 3. Diversity of Business, Employment, Problems and Expectations on IR of *Pemindangan*

Business Diversity	Employment	Problems	Hope
Shade	Human Resources (HR) is still low, limited, and the average business owner as well as workers so they are not paid	Limited capital Do not have the knowledge of entrepreneurship Do not have a business license yet Knowledge of the production process of limited *pemindangan* Limitations of raw materials Lack of product hygiene Simple technology Marketing is limited because the production depends on the fish season Prices fluctuate	There is soft capital assistance without collateral There is entrepreneurship training Ease of handling permits There is a production training of *pemindangan* Adequacy of raw materials There is product hygiene training There is an equipment aid that suits to the needs and conditions of IR Expansion of marketing Prices are stable

Sources: Tim Industri Rumahan Kabupaten Kendal, 2016.

Based on the above table, it shows that technology is one of the problems experienced by IR of *pemindangan* business. Appropriate technology is expected to help solve the problems encountered. All of this time the IR practitioners have received several times of equipment aid from the Department of Marine Affairs and Fisheries of Kendal regency, but the equipment is not used because it is not in accordance with the needs in the field. Some reason for such case is that the size of a given equipment requires a fairly wide area, whereas the average of the *pemindangan* does not have a large production site. In addition the equipment needs electricity, which is usually avoided practitioner of *pemindangan* business because it will raise the cost of production and reduce profits.

b. The Process of *Pemindangan*

Basically *pemindangan* is a process of (1) killing / minimizing bacteria by heating, (2) adding salt will kill / inhibit the growth of bacteria remaining in fish, (3) reducing water content in fish meat (Alyani *et al*., 2016). In Tambaksari village, the average production of per person day per day is 50 kg, and at least every day there will be at least 250 IR of *pemindangan* practitioners who process pindang fish and ready to be marketed, so the production of one village is about 250 times 50 kg which equals 12,500 kg. Raw material price is Rp. 15.000, - / kg while production and operational costs Rp. 2.000, - / kg, selling price is Rp. 20.000, - net profit Rp. 3,000, - / kg. So it can be calculated that the net profit per person per day is Rp. 150.000, -. If it is calculated in one village, the net profit reaches 12,500 kg times Rp.3.000, - equals Rp. 67.500.000, - or Rp. 2.025.000.000, - / month, or Rp. 24.300.000.000, - / year. *Pemindangan* IR activities depend on the availability of the main raw materials of fish. The availability of fish depends on the season. During the fish season, the number of fish is abundant, then almost all IR actors will do the process of *pemindangan*. But if the amount of fish is small in the market so it is difficult to get, then usually the process of *pemindangan* is only done by IR 2 (developed) and IR 3 (advanced).

Figure 1. The basin for mindang

The average of the *pemindangan* process is still done conventionally, especially in IR 1 and IR 2. Here are the stages in the process of the *pemindangan*; (1) fish feces removed from fish body then washed thoroughly, (2) the clean fish then packed in container, (3) after that comes to the salting process, (4) fish that has been salted then boiled, (5) then drained, (6) after being drained, the fish is cooled and (7) ready to be marketed.

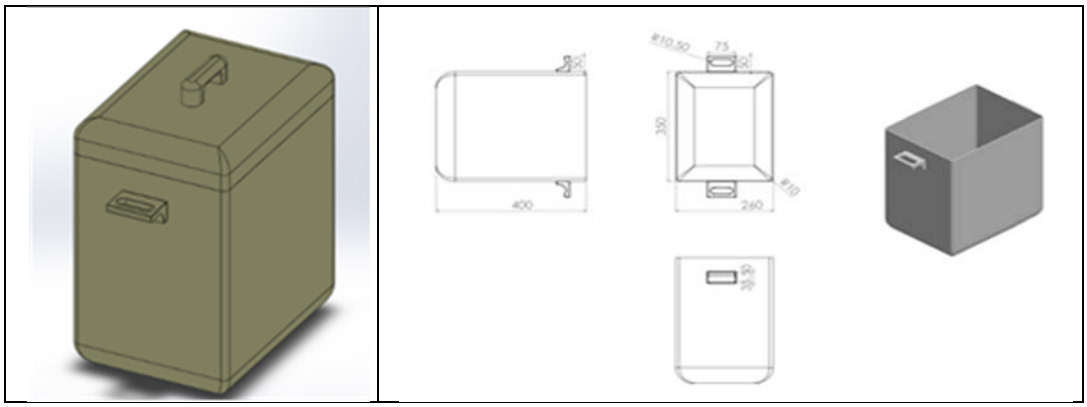
In the process of boiling pindang fish is IR practitioners are still using traditional equipment, simple which passes from previous generation. One of them is by using a basin, as seen in the following Figure 1.

The use of basin in boiling pindang fish causes the boiling process very long. For the production of 50 kg of fish takes approximately 8 hours. This makes the *pemindangan* lost a lot of time and energy in the production process. As a result, the marketing process is done the next day. The basin used is also unhygienic, so it does not meet the hygiene standards of processed products. In addition it will also make pindang fish rotten fast.

c. Appropriate Technology of *Pindang Pangkon*

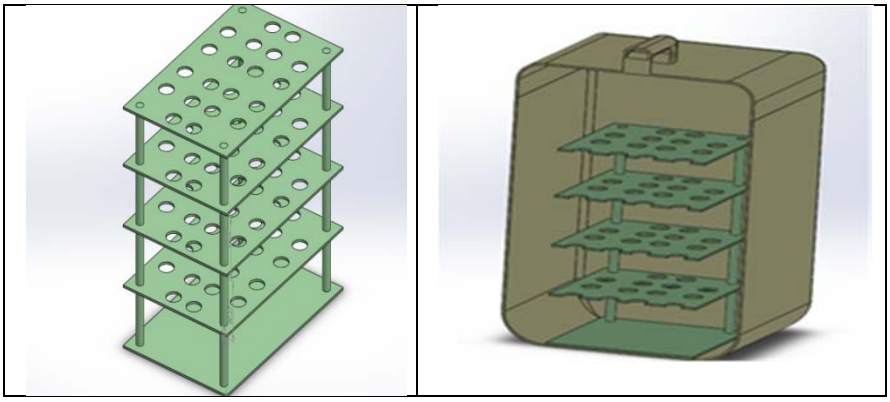
Pindang pangkon is a new technology innovation in the form of combination pans used to accelerate and facilitate the production of pindang. Here are the details Figure 2.

Figure 2. Appropriate *Pindang Pangkon*



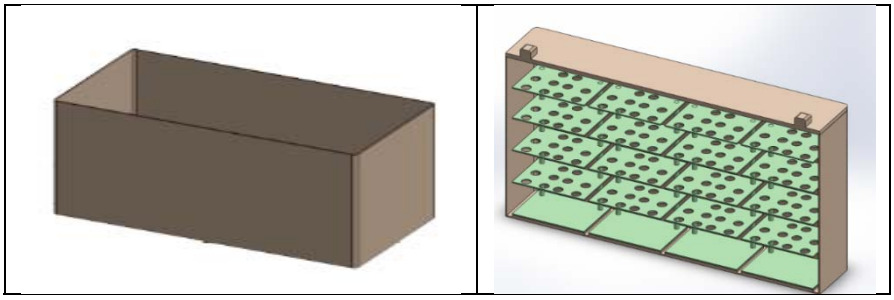
Working principle: (1) First water put into pot as high as 10 cm, (2) Cook water until boiling, (3) Meanwhile, arrange fish into fish rack, as in the following Figure 3.

Figure 3. Fish Shelves and Pans



(4) Fish that have been arranged on a fish rack inserted into the pan; (5) Fish is then boiled for about 20 minutes, (6) Lift the fish rack (along with the fish) and put in slow cooker box for the process of fish ripening, such as those seen in the following Figure 4.

Figure 4. A slow cooker box



(7) Close box (no leakage) and left for about 2 hours, (8) After that the fish is ready to be sold in hot condition.

Based on the facts in the field, the use of appropriate technology of *pindang pangkon* has several advantages such as the first, the fish is cooked evenly, this is because the fish are arranged in a fish rack and the heat circulation is evenly distributed. Second, the fish is not easily stale, because it is always in a long hot condition. Third, the fish will not get burn Fourth, gas saving because boiling fish only takes 20 minutes. Fifth, more hygienic, because during in the slow cooker box, fish are not contaminated by outside air and the sixth is saving time and energy, because it can be in one production. In the conventional production process of *pemindangan* takes 10 hours while with *pindang pangkon* only takes 4 hours. Therefore IR of *pemindangan* practitioner can directly market the pindang fish on the same day.

The use of appropriate technology in an effort to improve the welfare of the community must be adapted to cultural and economic conditions and their use must be environmentally friendly (Munaf 2008), including appropriate technology for *pindang pangkon*. In accordance with the cultural conditions of the Tambaksari Village people that the materials used in the manufacture of appropriate technology *pindang pangkon* are not contrary to the cultural values of local communities. In accordance with the economic conditions, the fuel used in the appropriate technology *pindang pangkon* can be from corncobs, wood powder, firewood or gas, this is in accordance with the economic conditions of IR 1 and IR 2 in Tambaksari Village. The use of those fuel is very economical so it does not put a burden to IR actors and also environmentally friendly.

Various types and variety of appropriate technology has actually been developed by various parties, both from the government, academics in the field of research and engineering as well as from the business world. Based on the results of mapping on the needs of appropriate technology undertaken by the Directorate General of Community and Village Empowerment, Ministry of Home Affairs of Indonesia, appropriate technology can be grouped into several types of technology, such as: appropriate technology tools for food processing, appropriate technology tools for energy use, appropriate technology for the provision of infrastructure, appropriate technology tools for environmental management and appropriate technology tools for economic capability. Of course, appropriate technology tools are designed and tailored to the needs, potential of natural resources and the ability of the community so that the tools can be utilized optimally. In this case the appropriate technology *pindang pangkon* is one example of the right kind of technology technology tool for food processing.

The role of appropriate technology for *pindang pangkon* when used optimally will be able to increase the income of home industry practitioner, provide added value of processed pindang fish products, improve the quality and assist in realizing productive business of home industry of efficient *pemindangan*. Implementation of appropriate technology is seen as a strategy to maximize the efficient utilization of all aspects of local resources (including natural, human, technological, and social resources) that can provide added value to improve the welfare of the community, and in turn will contribute to improve nation competitiveness. Technically appropriate technology is a bridge between traditional technology and advanced technology.

Conclusion

The appropriate technology of *pindang pangkon* can improve the quality of production of *pemindangan* home-based industry. Production process becomes time-saving, cost-effective and energy-efficient, in addition processed pindang fish produced are more hygienic and durable. Utilization of appropriate technology in accordance with local situation in turn will encourage the optimization of resources so as to create independence of *pemindangan* home industry actor which coupled with innovative activities.

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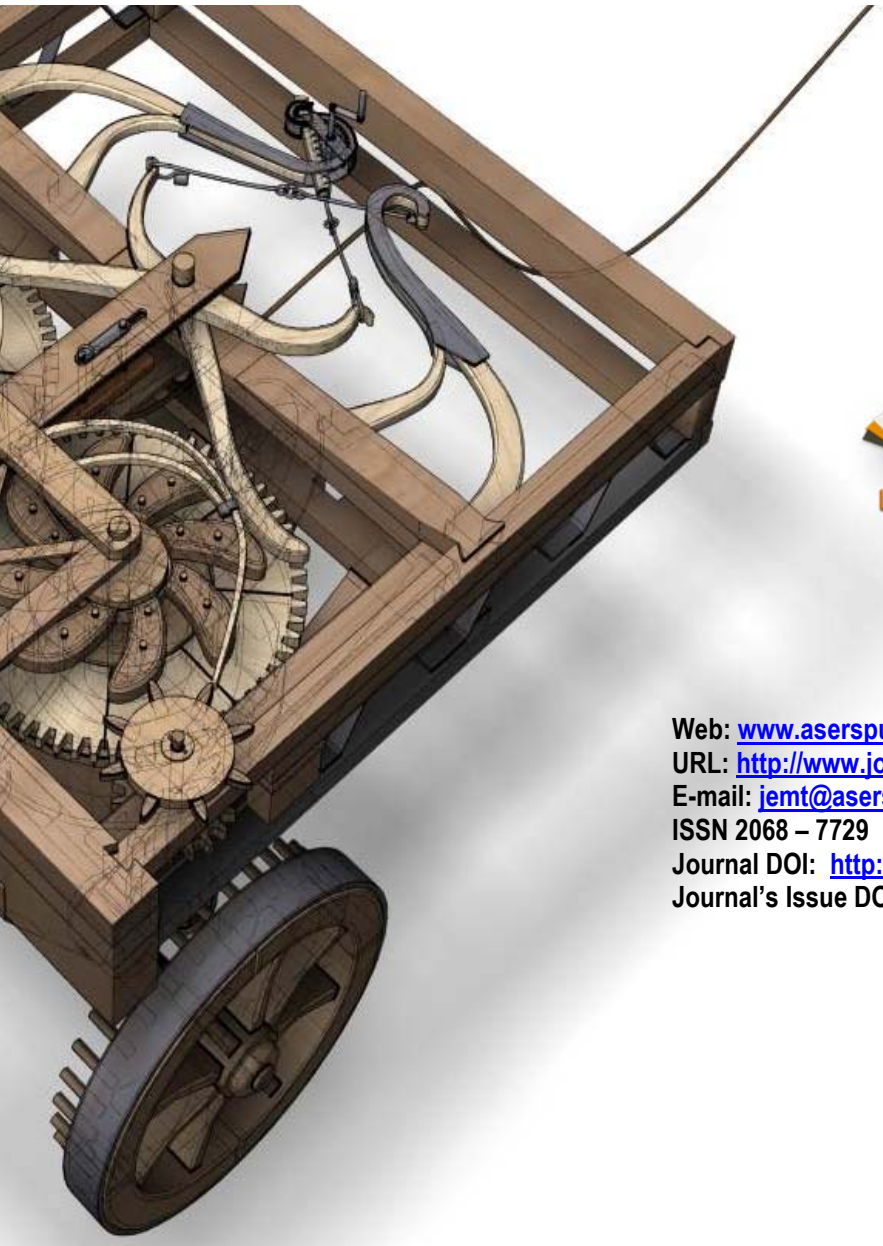

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