



Capacity Level of Extension Worker and Institutional Support in Developing the Capability of Extension Worker to use Information Technology

Helvi Yanfika, Yul Martin, Abdul Mutolib, Kordiyana K. Rangga, Ali Rahmat

Abstract: *The extension is an essential part of fishery sector services. Hence, efficient service of extension is necessary to support fishery activities to contribute to the increasing socio-economic level of fishery business players. These business actors, namely fish processors, fish farmers, and smallholder fishermen in Lampung Province, generally obtain such a little information as they are considered to be the passive group in seeking for information. Their primary concern is still to meet their daily needs, and this information is not yet a priority. In fact, a technological limitation also does not facilitate farmers to obtain information which results in a situation where extension worker is forced to be the main source of information for fishery business players. Therefore, it is essential to investigate how extension workers' capacity in using non-cyber and cyber information technology also the role of institutional support in the utilization of information technology to increase extension workers' capacity. This study was descriptive analysis research consisted of primary and secondary data. The method of data analysis used to answer the objective of this study was descriptive statistical analysis. The result of the analysis showed that extension workers' capacity level in using non-cyber information technology to perform their task was considered excellent, and extension workers did not only depend on the information provided by the related institution in using cyber information technology. Extension workers were found to use a smartphone and other media to obtain information. Institutional support, such as higher educational institutions, NGOs, Fishery Agency, and BPTP, was still low. Therefore, institutions should increase the use of information technology, assist in using cyber information technology, provide information of using cyber information technology, provide a specific location for conducting training of cyber information technology, and provide regular training schedule for extension workers to increase the capacity of fishery extension workers.*

Keywords: *Capacity, information technology, institution, extension.*

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I. INTRODUCTION

Increasing the capacity of extension workers in using information technology should be developed. The increasing the capacity of extension workers to access and implement information technology is key to develop useful Information and Communication Technology (ICT) in the scope of agriculture, including the development of Cyber Extension technology [1,2]. Moreover, Wardoyo and Veronice [3] mentioned that the ability to access information and communication technology in agricultural sector is one of important elements that should be comprehended by agricultural extension worker in order to support their role in providing information service according to farmers' need while following the rapid development of technology and communication science. To support this achievement, agricultural extension workers might seek and access information sourced from online media. Thus farmers can increase their farming business competitiveness. Technology and information develop rapidly in this globalization era, as seen in the use and development of technology to manage and develop sustainable resources. The rapid development of communication technology has created an impact on various communication media used in information exchange activity. Sumardjo et al. [4] explained that cyber extension is a mechanism of agricultural innovation communication that combines the application of computer-based information technology and communication with many other components of communication to reach the end-user. Today, agricultural business, particularly in the subsector of fisheries starts to grow. The capacity of a fish processor deals with many problems, both in terms of technical and managerial capability, also the use of information technology. One of the essential elements required to support agricultural activity is information. That agricultural information is crucial for farmer productivity since farmers could increase farm productivity by learning innovation through information [5].

An extension is the most important part of fishery sector services. Therefore, efficient extension service is necessary to support fishery activity to further contribute to the increasing social-economic level of fishery business players [6].

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Extension workers in most developing countries have applied traditional communication and information technology, including radio, drama, and video/television [5].

Fishery business actors, namely fish processors, fish farmers, and smallholder fishermen in Lampung Province generally obtain such a little information as they are considered to be the passive group in seeking for information. Their primary concern is still to meet their daily needs; this information is not yet a priority. Moreover, a technological limitation also does not facilitate farmers to obtain information.

In this situation, extension workers are insisted on being the source of information for fishery business players. However, fishery extension workers in the field cannot play their role completely in addition to the limited facility of information technology. The use of information technology by extension worker as a facility to increase extension workers' performance and capacity highly requires the support of other institution.

Prawiranegara *et al.*, [7] reported that the support of extension institution together with a research institution, training institution, input-output institution, and policy did not significantly affect the role of farmer institution to enhance the capability of information and communication technology-based farmer innovation. Moreover, weak agricultural institution exists due to an inadequate number of extension workers as well as their lack of capacity, which further results in inefficient farming system and low profit gained by farmers. Result of the study conducted by Hattab [8] concluded that cooperation network between agricultural extension and many parties, such as Cooperative, Farmer Association, NGO, Research Institution, and Higher Educational Institution is aimed to establish cooperation in order to obtain various information to be processed and delivered to farmers, including financing pattern and its condition, health service, and so on. Therefore, it is required to investigate how extension workers' capacity in using non-cyber and cyber technology, also the role of institutional support concerning the use of information technology to increase extension workers' capacity

II. MATERIALS AND METHOD

Location, Respondent, and Time of Research

The study was conducted in Pringsewu Regency, Lampung Province. Data collection was done in June 2019. The research location was purposively selected by reason of 10 fishery extension workers in the area.

Table 1. Number of fishery extension worker in Pringsewu Regency

No	Extension Worker	Total (people)	Percentage (%)
1	Civil servant	5	50
2	Honorary worker	2	20
3	Contract extension worker	3	30
Total		10	100

Method of Data Collection

Data collected in this study consisted of primary and secondary data. Primary data are data directly obtained by the data collector through direct interview with the respondent.

Primary data collection in this study was done using a questionnaire (list of questions) besides conducting direct observation in the field. Secondary data were indirectly collected from the institution and literature related to this study.

Method of Data Processing and Analysis

The method of data analysis applied to answer the objective of this study included descriptive and inferential statistic analysis. Analysis of descriptive statistics was used to describe internal and external support besides the capacity of fishery extension workers through data summarizing methods, such as scoring and statistical mean using a frequency table.

III. RESULTS AND DISCUSSIONS

Availability of non-cyber information technology

Non-cyber information technology media is the existence of mass media used to facilitate the distribution of information to the public. Non-cyber information technology or interpreted as mass media, both print and electronic. Mass media is considered to have a broader range which reaches remote areas. Print mass media focused in this study was newspaper and magazine, while electronic mass media included radio and television. Nowadays, mastery of information technology by extension workers to obtain information and innovation is vital. Agricultural information could be in the form of information about farming technics (planting, planting distance, seed variety, etc.), the price of the crop, the price of fertilizer, and information of agricultural research findings [9]. Increasing the capacity of extension workers is affected by the availability of conventional media, such as: (1) suitability level of conventional media, (2) completion level of conventional media, and (3) the reach of conventional media. Hence, adequate conventional media availability will increase the capacity of extension workers. Moreover, the distribution of respondent in using non-cyber information technology is presented in Table 2.

Based on the result of the study conducted in Pringsewu Regency, non-cyber information technology is still frequently used to facilitate extension workers to access information to increase the capacity of extension workers. Non-cyber information technology commonly used in Pringsewu Regency to increase fishery extension workers' capacity was mass media, including TV, radio, newspaper, and magazine. According to some respondents, the availability of non-cyber information technology was categorized as moderate. It shows that the use of mass media is considered quite useful to increase the capacity of fishery extension workers. The use of mass media is believed to benefit fishery extension workers in obtaining agricultural information which will further ease them to deliver extension material to farmers.

The use of mass media is also useful in the distribution of extension material besides its lower cost and easiness to be comprehended by fish processors, fish farmers, and fishermen. Mass media is essential as it is used to exchange information or material among extension workers as well as to share the latest information related to extension activity to their superior.

Table 2. Distribution of respondent by the availability of non-cyber information technology

No	Availability of Non-Cyber Information Technology	Total	Percentage
	Low (27-54)	0	0
	Moderate (55-81)	5	50
	High (82-108)	3	50
	Average	79,6	(Moderate)

Mass media also can be used according to farmers' need and work demand for extension workers. Furthermore, extension workers used mass media to develop business partner and establish coordination between extension workers and fish processors, fish farmers, and fishermen. Moreover, extension material and agricultural information were easy to obtain, test, and enjoy for its result. Actuality level of agricultural information obtained from mass media was considered high by most respondents.

Accessibility of non-cyber information technology

Based on the result of the interview with respondents of fishery extension workers in Pringsewu Regency, the access of agricultural information from mass media could only be obtained in the BP4K of regency capital. Information obtained by using mass media has not reached a remote area. Moreover, the type of media often used by fishery extension workers included leaflet, brochure, TV, radio, magazine, and banner. Information obtained from mass media was in the form of agricultural news and information.

The Use of Information Technology

In using cyber information technology, extension workers do not only depend on the availability of information in the related institution. Extension workers also used smartphone and other media to obtain information. In more detail, the use of cyber information technology to facilitate fishery extension workers to increase their capacity is shown in Table 3.

Table 3. Distribution of respondent by the level of information technology use in Pringsewu Regency

Category	Aspect of knowledge		Aspect of behavior		Aspect of Capability		
	Total	%	Total	%	Total	%	
1	Access level						
	Low	0	0	0	0	2	25
	Moderate	1	12,5	0	0	2	25
	High	7	87,5	8	100	4	50
	Average	50,9		23,8		15,1	
2	Intensity of use						

	Low	0	0	2	25	1	12,5
	Moderate	2	25	6	75	2	25
	High	6	75	0	0	5	62,5
	Average	7,5		7,8		19	
3	The level of information management						
	Low	0	0	1	12,5	3	37,5
	Moderate	1	12,5	6	75	3	37,5
	High	7	87,5	1	12,5	2	25
	Average	9,25		15		5,8	
4	Information distribution						
	Low	0	0	1	12,5	3	37,5
	Moderate	0	0	7	87,5	4	50
	High	8	100	0	0	1	12,5
	Average	8,9		16,5		15	
5	Feedback management						
	Low	0	0	0	0	1	12,5
	Moderate	0	0	8	100	5	62,5
	High	8	100	0	0	2	25
	Average	9,5		29,8		16	

The use of cyber information technology by extension workers in Pringsewu Regency was categorized as moderate. This finding was not in line with the result of a study conducted by Elian *et al.* [10] which showed that the use of technology by extension workers was considered low. The use of information technology was based on three aspects, namely knowledge, behavior, and capability of extension workers in performing their tasks, that is assisting fish processors, fish farmers, and fishermen.

The Level of Cyber Information Technology Access

Result of this study showed that the access level of fishery extension workers on the use of cyber information technology was found to be high, both in the aspect of knowledge, behavior, and capability of extension workers. High access level of fishery extension workers on the use of information technology in the aspect of information technology knowledge was due to the fact that 50 percent of BP3K has been facilitated. The government has facilitated BP3K with computer and internet network to help extension workers to access agricultural information, opportunity to participate in the training of using the internet and mass media to increase its capacity. Moreover, BP3K also has its own blog to upload and access information in addition to its Facebook, Whatsapp, BBM, and social media account. In term of behavior aspect, the level of fishery extension workers in using information technology to increase their capacity was high. Extension workers easily accessed and obtained information about agriculture by using internet, print and electronic media. Extension workers often read print media to obtain and access sources of information.



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Moreover, in the aspect of capability, extension workers accessed information technology through the internet, social media, email, and electronic media almost every week, while fishery extension workers accessed print media such as magazine and newspaper every month.

The Level of Use Intensity

Based on the result of a study concerning the use of information technology, the use intensity in the aspect of knowledge and capability was found to be high. At the same time, it was moderate in the aspect of behavior. Fishery extension workers often used the internet to access information, read newspaper and magazine and listened to radio also watched TV to obtain information and better insight. Extension workers used the internet, print media, and electronic media daily to increase their capacity. Extension workers used the internet more frequently because most of them had a smartphone to access information. Using a smartphone was considered to be more effective compared to using a laptop since the smartphone was more practical and mobile to be carried anywhere. In fact, society nowadays, even in such a remote village, cannot be separated from smartphone and internet connection.

The Level of Information Management

The use of information technology to process information had a similar result to the intensity of the internet, which also categorized as high in the aspect of knowledge, and moderate in the aspect of behavior and capability. Fishery extension worker used the internet, print media, and electronic media to process information obtained and tool to facilitate extension activity. However, the capability of extension workers to repackage information obtained before being distributed to farmers was still low. According to Elian *et al.* (2014), agricultural extension workers either kept information for themselves, shared it to fellow extension workers, and distributed it to farmers as extension material. More than half of respondents used the information to be discussed to fellow extension workers, and further shared to farmers and kept for themselves.

The Level of Information Distribution

Result of the study showed that the use of information by fishery extension workers in distributing information to fish processor, fish farmer, and fishermen was high. Moreover, it was categorized as moderate concerning the aspect of behaviour and capability. Extension workers were able to use internet, print and electronic media to distribute information to fish processor, fish farmer, and fishermen. The majority of fishery extension workers in Pringsewu Regency agreed that internet, print media, and electronic media were easy to use to distribute information and extension workers were able to use those media almost every month.

The Level of Feedback Management

Result of this study showed that feedback management by fishery extension workers was in a high category in the aspect of knowledge. In contrast, in the aspect of behaviour and capability, it was categorized as moderate. Fish processors, fish farmers, and fishermen have already used the internet, print media and electronic media to provide suggestion to extension workers. Moreover, the internet, print media, and

electronic media were used by extension workers to give a recommendation to supervisor and fellow extension workers. The internet, print media, electronic media were used by extension workers to obtain information from fish processors, fish farmers, and fishermen also fishery agency or related stakeholder every month.

Support of Other Institution in Using Information Technology

To ease extension workers in obtaining various information, they established cooperation with other institutions, such as higher educational institution, company, government institution, NGO, and research institute (BPTP). New information will be easy to get due to good cooperation established between extension workers and institutions. Nevertheless, the result of this study indicated that support of the higher educational institution, company, government institution, NGO, and research institute in the use of cyber information technology to increase the capacity of fishery extension workers in Pringsewu Regency should be increased. The role of other institutions to support the increased capacity of fishery extension workers in using information technology is presented in Table 4.

Table 4. Distribution of support from other institutions in Pringsewu Regency

No	Support of other institutions	Total	Percentage
1	The role of higher educational institution		
	Low	5	62,5
	Moderate	3	37,5
	High	0	0
Average		12,6	
2	The role of company		
	Low	8	100
	Moderate	0	0
	High	0	0
Average		11	
3	The role of government		
	Low	4	50
	Moderate	4	50
	High	0	0
Average		14,3	
4	The role of NGO		
	Low	8	100
	Moderate	0	0
	High	0	0
Average		10	
5	The role of research institute (BPTP)		
	Low	6	75
	Moderate	2	25
	High	0	0
Average		11	

Support of other institutions is referred to the principle of the triple helix, reflecting a synergy to be built by academician, business player, and the government. The three components have a different role by its capacity. However, the result of the interview showed that the relationship between the three aspects in supporting the use of cyber information technology in Pringsewu Regency to increase extension workers' capacity was still within the low category.

a. The Role of Higher Educational Institution

The higher educational institution has a crucial role in the development and utilization of fishery extension workers related to the increasing capacity of extension workers. A positive relationship was formed between the higher educational institution and the increasing capacity of extension workers in using cyber information technology also the access level towards the technology. The higher role played by higher educational institution will lead to a higher capacity of extension workers in using technology to support the performance of extension workers. However, according to the result of the study, the role of higher educational institution in Pringsewu Regency concerning the use of cyber information technology to increase the capacity of fishery extension workers still needs improvement. Participation of higher educational institution in training activity of cyber information technology use was considered low; hence such a supporting facility is necessary. The higher educational institution has its own role in facilitating and providing cyber information technology facilities in order to increase the capacity of extension workers in using cyber information technology.

Currently, higher educational institution has less of a role in facilitating information technology to increase the capacity of fishery extension workers. Furthermore, higher educational institution also plays role to assist and provide sufficient information for extension workers in using cyber information technology through a scheduled training activity. However, the role of higher educational institution to support fishery extension workers in increasing the capacity through the use of information technology has no been implemented properly. In a study carried out by Hattab (2004), extension workers built networks with higher educational institution to obtain many information to be further processed and delivered to farmers. However, it was found that some extension workers become the source of information for related institutions, resulted in a reverse relationship between extension workers and higher educational institution, thus it was not significant in increasing the capacity of extension workers.

b. The Role of Company

The company played a role in supporting fishery extension workers to use information technology, access level, and the use of information technology. Based on the interview result, the role of agribusiness company to support the increased capacity of fishery extension workers through the use of cyber information technology in Pringsewu Regency was still low. According to fishery extension workers in Pringsewu Regency, the company did not play such role or support to the increasing capacity of fishery extension workers through the use of cyber information technology. The company did not

participate in the implementation of information technology training activity, provide information technology facility, provide assistance concerning the use of information technology, provide information about the use of information technology, provide a specific location for training, and provide regular training schedule for extension workers. In fact, the company focused on establishing a partnership with fish processors, fish farmers, and fishermen in collecting and marketing products. Moreover, the role of the company to support fishery extension workers in increasing their capacity through the use of cyber information technology has not been felt by fishery extension workers.

c. The Role of Government Institution

Government institution such as the Agency of Fisheries and Marine Affairs has an important role in facilitating extension workers to increase their capacity in performing their tasks. Result of the interview shows the low role of a government institution to support the increased capacity of fishery extension workers by using cyber information technology. However, some respondents also thought that government had played a role although it is was not optimal. It was found that government institution rarely participated in the implementation of cyber information technology training activity, provided information technology facility, assisted with the use of information technology, provided information about the use of cyber information technology, provided a specific location for training, and provided regular training schedule for fishery extension workers in Pringsewu Regency.

According to Iqbal [11], it was an ideal option if agricultural development program is integrated applied by involving stakeholders, thus planning, implementation, and continuity of activity will be consistent with the program goal. Moreover, the role of Local Government Agency (SKPD) was found to have a positive and significant relationship with the use of IT and IT use intensity. The role of SKPD also positively and significantly affected the access level. This finding indicated that the higher role of SKPD would result in higher use of TI, access level, and use intensity. However, the non-optimal role of government led to a non-optimal capacity of extension workers in using cyber information technology.

d. The Role of Non-Governmental Organization (NGO)

Non-Governmental Organization (NGO) is an organization that gathers public aspiration to be forwarded to the government. According to the result of the interview with the respondent, the role of NGO in increasing fishery extension workers' capacity was found to be low. NGOs infrequently participated in the implementation of cyber information technology training activity, provided cyber information technology facility, provided assistance concerning the use of cyber information technology, provided information about the use of cyber information technology, provided specific location for training of cyber information technology, and provided regular training schedule for fishery extension workers to increase their capacity.

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e. The Support of Research Institute (BPTP)

Based on the result of the interview with the respondent, Research Institution (BPTP) was found to be less active to support fishery extension workers in increasing the capacity of extension workers concerning their task by using cyber information technology. Research Institution (BPTP) rarely participated in cyber information technology training activity, provided cyber information technology facility, provided assistance concerning the use of cyber information technology, provided information about the use of cyber information technology, provided specific location for training of cyber information technology, and provided regular training schedule for fishery extension workers to increase their capacity.

IV. CONCLUSIONS

Capacity level of extension worker to use non-cyber information technology in performing their tasks was found to be excellent since some respondents considered that the availability of non-cyber information technology was within the moderate category. It shows that the use of mass media is quite effective to increase the capacity of fishery extension workers. Mass media is believed to benefit fishery extension workers in obtaining agricultural information that will further ease them to deliver the extension material. In using cyber information technology, extension workers did not only depend on the information available in the related institution. Extension workers used smartphone and other media to obtain information. In detail, the use of cyber information technology will facilitate fishery extension workers to increase their capacity.

Institutional support, such as from higher educational institution, company, NGO, Fishery Agency, and BPTP was still low; thus institute should increase the use of information technology, besides, to assist in using cyber information technology, provide information of using cyber information technology, provide specific location for conducting training of cyber information technology, and provide regular training schedule for extension workers to increase the capacity of fishery extension workers.

REFERENCES

1. R.S.H. Mulyandari "Alternatif Model Diseminasi Informasi Teknologi Pertanian Mendukung Pengembangan Pertanian Lahan marginal" Prosiding Seminar Nasional Pemasarakatan Inovasi Teknologi dalam Upaya Mempercepat Revitalisasi Pertanian dan Perdesaan di Lahan Marginal. Mataram, 30-31 Agustus 2011
2. I. Listiana, I. Efendi, and A. Rahmat, "The behavior of extension agents in utilizing information and technology to improve the performance of extension agents in Lampung Province", Journal of Physics: Conference Series, Volume 1155, Number 1, 2019: doi:10.1088/1742-6596/1155/1/012004
3. Wardoyo and T.R. Veronica, 2013. "Pengaruh good corporate governance, corporate social responsibility & kinerja keuangan terhadap nilai perusahaan", Jurnal Dinamika Manajemen, Volume 4, Number 2, 2013: 132-149.
4. Sumardjo and R.S.H. Mulyandari "Implementasi cyber extension dalam komunikasi inovasi pertanian" Jurnal Informatika Pertanian, Volume 19, Number 2, 2010: 17-43.
5. L.O. Obinna and F.C. Nzeakor, "Improving agricultural extension delivery service through the use of information and communication technology in Abia State, Nigeria" ARPN Journal of Science and Technology, Volume 4, Number 1, 2014: 52-58
6. H. Yanfika, I. Listiana, A. Mutolib, and A. Rahmat "Linkages between extension institutions and stakeholders in the development of

sustainable fisheries in Lampung Province" Journal of Physics: Conference Series, Volume 1155, Number (1), 2019: doi:10.1088/1742-6596/1155/1/012014

7. D. Prawiranegara, Sumardjo, D.P. Lubis, and S. Harijati "Strengthening role of farmer institution in enhance of innovation capability based on ict in West Java Province, Indonesia" International Journal of Humanities and Social Science, Volume 5, Number 12: 2015: 128-136.
8. S. Hattab "Jaringan Kerjasama Penyuluhan Pertanian" Prosiding Temu Teknis Nasional Tenaga Fungsional Pertanian. Pusat Penelitian Dan Pengembangan Peternakan: 333-340. 2004
9. Van den Ban AW and Hawkins HS. Penyuluhan Pertanian (Edisi terjemahan oleh A. Dwina Herdiasti). Kanisius. Yogyakarta. 1999
10. N. Elian, D.P. Lubis, P.A. Rangkuti "Penggunaan internet dan pemanfaatan informasi pertanian oleh penyuluh pertanian di kabupaten bogor wilayah barat" Jurnal Komunikasi Pembangunan, Volume 12, Number 2, 2014: 104-109.
11. M. Iqbal "Analisis pemangku kepentingan dan implementasi dalam pembangunan pertanian" Jurnal Litbang Pertanian, Volume 26, Number 3, 2007 :89 – 99.

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