



PROSPECTIVE ANALYSIS STRATEGY FOR REDUCING FLOATING NET CAGES AT CIRATA RESERVOIR (CASE STUDY OF MANIIS SUB-DISTRICT PURWAKARTA REGENCY, WEST JAVA)

Asep Agus Handaka Suryana¹, Nabilah Putri Komara², Emma Rochima¹ and Atikah Nurhayati¹

¹Lecturer at Faculty of Fisheries and Marine Science, Padjadjaran University, Bandung – Sumedang KM. 21 Jatinangor 45363, Indonesia
E-mail address: asep.agus@unpad.ac.id

²Student at Faculty of Fisheries and Marine Science, Padjadjaran University, Bandung – Sumedang KM. 21 Jatinangor 45363, Indonesia
E-mail address: viridamartogi@yahoo.com

KeyWords

KJA (floating net cages), MICMAC, Prospective Analysis, Stakeholders.

ABSTRACT

This reseach is carried out from July until November 2018 in the Cirata Reservoir, Maniis Subdistrict, Purwakarta Regency. The purpose of research is determining prospective analysis strategies for reducing the number of floating net cages in the Cirata Reservoir without causing conflict. The method of the research is descriptive qualitative with a prospective analysis approach then the data are obtained from primary data, namely interviews and secondary data or literature by using purposive sampling technique. The respondents are selected based on data requirement and the background of the research. Interview results are analyzed using MICMAC software to find out which stakeholders affected all activities in reducing the number of KJA. The research result show that the stakeholders who influence the socialization activities are BPWC, DKPP, TNI, MPC, Villagers and Community Leaders which are TNI, KJA Owners, Village Officer and BPWC have the influence for implementation activities. This research will provide scenarios and operational recommendations for activities in reducing the number of KJA at the Cirata Reservoir Maniis Subdistrict, Purwakarta Regency.

INTRODUCTION

Reservoirs are ecosystems consisting elements of water, aquatic life and land which are influenced by the high and low water levels, so that the reservoir will affect the climate and the balance of the surrounding ecosystem. Reservoirs have two functions including the main and derivative functions, the main function of the reservoir acts as a reservoir of water that can be used for various purposes such as electricity generation, irrigation, raw water sources, flood control and groundwater sources. The function of reservoir derivatives is as a business of aquaculture, fishing and transportation tourism (Widiastuti 2015). Reservoirs in some areas are used as land for aquaculture using the floating net cage system, in West Java which produces fisheries production in the KJA cultivation system, one of which is Cirata Reservoir with an average production volume of 6,450 tons/month, it can be said that activities freshwater aquaculture in the Cirata Reservoir is the largest in Indonesia with an average production volume of 6,450 tons of fish per month or 39.5% of all floating net production in West Java (Widiyati 2009).

Cirata Reservoir is a built in the Citarum River Basin which is intended as a hydropower. Located with puddles covering 15 villages, 5 sub-districts and 3 regencies namely West Bandung, Purwakarta and Cianjur (Komarawidjaja 2005). The floating net cage (KJA) activity has begun to be applied in 1987 with the initial goal of developing floating nets in the Cirata Reservoir to provide new jobs for residents affected by the hydropower development project, based on West Java Governor Decree No. 41 of 2002, the number of floating net cages (KJA) in Cirata Reservoir was 12,000 plots, with the Cirata Reservoir area of Purwakarta Regency being 9,154,094 m² which included zone 2 with 4,644 plots of floating net cages (Ardi 2013).

The increase from year to year for KJA aquaculture activities in Cirata Reservoir, based on the results of the 2018 census the number of KJA increased very rapidly reaching 98,397 plots and included in the Purwakarta Regency area were 20,222 plots, with 1,266 RTP (Farmer Households), where the majority of ownership of KJA does not belong to the surrounding community, but belongs to migrants from outside the area who invest their capital to do business in KJA Cirata Reservoir (Humas Purwakarta). The Purwakarta Regency area which is included in the pool of Cirata Reservoir is only Maniis Subdistrict, has the smallest land compared to the other Districts in the pool of Cirata Reservoir, so the number of KJA in the area is less than in other regions. The initial number of KJA in Maniis Subdistrict was 4,644 plots, developing very rapidly based on the results of the 2018 census by BPWC as many as 20,222 plots, so that the placement of sufficiently densely packed KJA plots resulted in gradual sedimentation and large numbers of water hyacinths growing in the area and the accumulated water can flow to other areas because it is carried by the current (BPWC 2018).

An increase in the number of KJA plots can cause aquatic environmental problems that occur among others, reservoir pollution in the form of waste, eutrophication, sedimentation of fish food residues that settle at the bottom of reservoirs that can cause fish deaths during upwelling, this occurs because only a small amount of feed is absorbed by fish and the others are thrown into the aquatic environment and will cause the water's capacity to continue to shrink, so the reservoir will continue to experience siltation. Aquaculture activities in KJA develop outside the control of environmental carrying capacity, this will reduce the condition of the waters so that it can disrupt the lives of biota and other organisms in the reservoir (Fauzi 2004).

KJA aquaculture activities that continue to be left, there will be many changes causing loss of value such as disruption of the hydropower system, reduced value of the beauty of the reservoir, loss of cultivation land, and damage to conservation values and natural tourism in the Cirata Reservoir. To be able to overcome this, good and correct management is needed, as well as a reduction in the number of KJA which is one of the donors of sources of environmental pollution and a decrease in water quality so that the Cirata Reservoir can be used sustainably. At present the Citarum River Basin has been polluted and damaged, so the Government has issued Presidential Regulation Number 15 of 2018 concerning the Acceleration of Pollution Control and Damage to the Citarum River Basin, in order to overcome these problems, it is necessary to control and organize the KJA (Purwakarta District Public Relations).

The process of reducing the amount of KJA in the Cirata Reservoir can involve various kinds of stakeholders. Stakeholders are individuals or groups who have an interest in a decision in terms of what is related, it can also be called a stakeholder. Stakeholders in reducing the number of KJA in the Cirata Reservoir serve to socialize the reduction in the number of KJA, the implementation of a reduction in the number of KJA and after the reduction in the number of KJA to the community affected by the reduction in the number of KJA. There are

several groups

of stakeholders including the government consisting of Cirata Reservoir Management Agency (BPWC), Fisheries and Marine Sciences Office Purwakarta, Purwakarta Environmental Office, Purwakarta Youth and Sports Tourism Office, related UPTD Purwakarta, District and Village Public Aquatic Fisheries Development. The community groups consist of the Community Care About Cirata (MPC), Cirata Reservoir Farmers Association (Aspindac), KJA Business Owners, Feed Distributors and Community Leaders. Law enforcement agencies or officials, namely Koramil, the academics concerned with this matter (Widiyati 2009).

A special strategy is needed after the establishment of stakeholders to reduce the number of KJA in the Cirata Reservoir in the Maniis Subdistrict, therefore the importance of this research is carried out in a research journal namely prospective analysis of strategies to reduce the number of floating net cages in Cirata Reservoir by taking case studies in affected districts KJA, Maniis District, Purwakarta Regency, West Java.

METHODS

The method that will be carried out in this research is through descriptive analysis. Descriptive analysis method used, carried out with a prospective analysis approach that is describing and formulating scenarios to predict all possibilities that will occur in the future. Scenarios are arranged based on conditions that may occur in the future on key influential factors (Hartrisari 2002).

Place and Time

Research has been carried out in July – November 2018, which includes the stages of data collection, data analysis and final report writing. The research location is Maniis Subdistrict, Purwakarta Regency with direct interviews using questionnaires to determined stakeholders.

Data Collection Method

The data collection method used in this research was conducted in three ways, namely interviews with questionnaire assistance to stakeholders, direct observation, and study of literature / documents.

Respondents' Data Collection Tehniques

In this research, Purposive sampling technique is used, where sampling is only based on research considerations. According to Arikunto (2006) purposive sampling is a technique of taking samples not based on random, regional or strata, but based on the existence of considerations that focus on specific goals. The respondents consisted of key respondents or experts and ordinary respondents. Have the ability, expertise and interests in accordance with the research topic. The criteria of the respondents include having an important role in the process of reducing the number of KJA in Cirata Reservoir such as Section Heads in the relevant Dinas, KJA Cultivators who dominate the KJA land, TNI Kodim and Babinsa (Village Advisors), MPC Chairmen, Aspindac Chairmen, Academics who know there is a reduction in the number of KJA in Cirata Reservoir and Community Figures, so that the results of the interview data produced can be maximized and reduce subjective results.

Data Processing Method

The data analysis method used in this research is prospective analysis using MICMAC software. MICMAC is an open-source free software, can be used in a variety of reconstruction scenarios that have a purpose, designed to provide an overview of the process from reality. Can be used as a reference to see the influence and dependence of one variable with other variables which are then explained descriptively as a result of the influence of these variables, whether the variable is included in the influential or has the dependence on other variables.

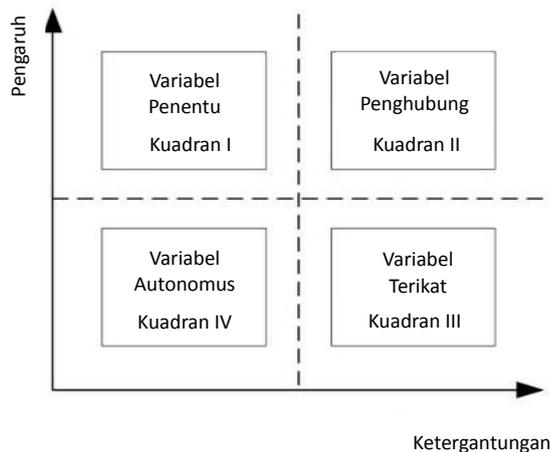


Figure 1. Impact and Dependency Diagram

- Independent Variables (Kuadran I)
Elements included in this category are elements that have a strong driving force and a weak dependence on other factors.
- Linkage Variables (Kuadran II)
Elements included in this category are elements that have a strong driving force and dependency, or in other words become a key to success that will significantly influence these measurements.
- Dependent Variables (Kuadran III)
Elements included in this category are elements that have weak driving forces and strong dependence on other factors.
- Autonomus variable (Kuadran IV)
Elements included in this category are elements that have weak driving forces and dependencies. Does not have a significant effect on the measurement process.

To find out the most important force, there is agreement on a value, suggesting a sign of role. P values can also be given if the effect may occur in the future or doubt. Assessment uses a cross-impact matrix where each element represents the role of the variable in the specified column row. All factors identified will be assessed directly between other factors.

Table 1. Guidelines for Prospective Analysis Assessment

Skor	The Role of Stakeholders
0	No Role
1	A Small Role
2	Moderate Role
3	Very Strong Role

Suorce: Hardjomidjojo (2012)

RESULT AND DISCUSSION

Key Stakeholders in KJA Amount Reduction Socialization

The results of the literature study and direct observation with the method of in-depth interviews with stakeholders regarding the socialization of the reduction in the number of KJA in Maniis Subdistrict, Purwakarta Regency, obtained the results of analysis using MICMAC software for stakeholders who were very influential in the socialization of KJA numbers in Maniis District, Purwakarta Regency in Figure 2.

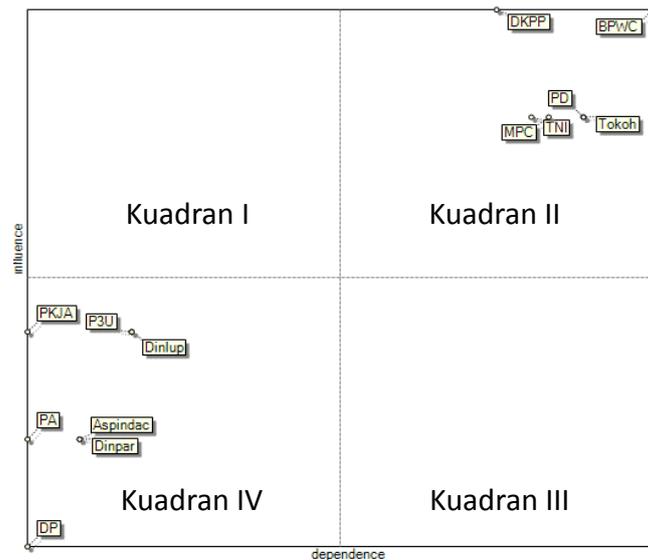


Figure 2. Results of Analysis o Key Stakeholders on KJA Amount Reduction Sozialization

Stakeholders include :

- Aspindac : Cirata Reservoir Fish Farm Association
- BPWC : Cirata Reservoir Management
- DKPP : Purwakarta Marine and Fisheries Department
- Dinlup : Puwakarta Environment Department
- Dinpar : Purwakarta Tourism Department
- DP : Feed Distributor
- MPC : Community Care About Cirata
- P3U : UPTD Public Fisheries Development
- PA : Academic
- PD : Village Officials
- PKJA : KJA Business Owner
- TNI : Indonesian National Army
- Tokoh : Public Figure

Quadrant I is a determinant or independent variable, in quadrant I has a strong driving force and weak dependency, so that in the analysis results there are no stakeholders who occupy quadrant I because stakeholders do not carry out such activities alone or only move by one agency and can be said need other stakeholders to carry out the socialization activities.

Quadrant II, the stakeholders can be interpreted as having a strong driving force and dependence and can be said to be a key variable and influence each other in carrying out the socialization of the reduction in the number of KJA in the Cirata Reservoir in the Maniis District.

- BPWC → As the manager of the Cirata Reservoir waters.
- DKPP → As a manager of the KJA aquaculture sector in the Cirata Reservoir.
- TNI → As a security unit in helping disseminate information.
- MPC → As a speaker of socialization.
- PD → Provide clearer direction to the community.
- Tokoh → Make it easy to deliver socialization to the community.

Based on Kep. West Java Governor No. 523.34 / Kep.917 - DKP / 2017 Concerning the Task Force for the Control and Position of Floating Net Cages in the Cirata Reservoir has been formed by the task force (Satuan Tugas) to carry out this activity chaired by the Provincial Marine and Fisheries Service, the vice chairman is the Cirata Reservoir Management Agency (BPWC) and the security sector are chaired by Kodam III / Siliwangi and other members based on the relevant regions, namely the Purwakarta Koramil. BPWC has conducted 2 socialization sessions in Maniis Sub-district, in March and April 2018.

Variable III consists of factors that have weak driving force and strong dependence from other factors, in this research there is no result of stakeholders who have strong and dependent drivers that are strong compared to others in the socialization of KJA reduction in Cirata Reservoir in Maniis Subdistrict . Elements included in quadrant IV are elements that have a driving force and dependency that is weak or does not have a significant effect on the measurement process. Dinpar, Dinlup, Aspindac, academics, feed distributors, KJA owners and UPTD P3U are in quadrant IV positions which means that stakeholders in the quadrant do not play a role in carrying out socialization activities to reduce KJA numbers, but stakeholders in quadrant IV can provide advice and input to key stakeholders to carry out socialization activities to reduce the number of KJA in the district of Maniis in order to create safe, orderly and acceptable socialization activities for people who will be affected by the reduction in the number of KJA in the Maniis.

Key Stakeholders in KJA Amount Reduction Implementation

The results of the literature study and direct observation by in-depth interviews with stakeholders regarding the implementation of the reduction in the number of KJA in Maniis Subdistrict, the results of analysis using MICMAC software for stakeholders that greatly influence the implementation of the reduction in the number of KJA in Maniis Subdistrict.

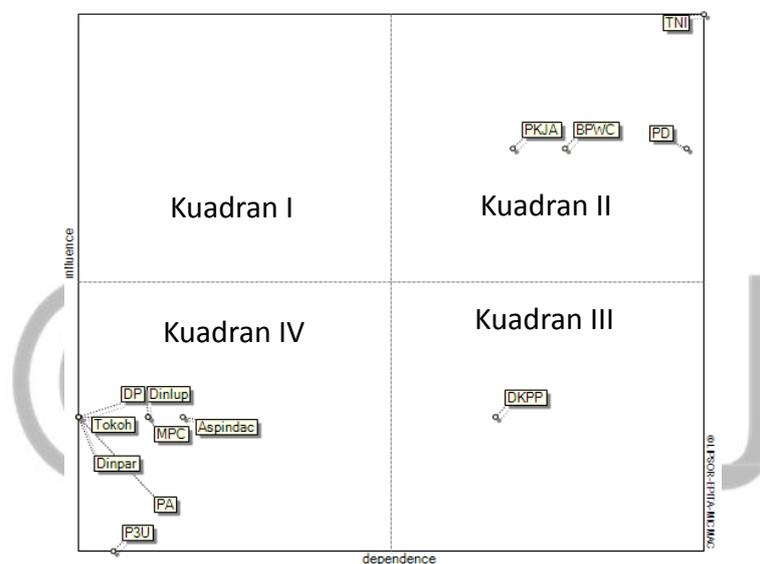


Figure 3. Results of Analysis Key Stakeholders on the Implementation of KJA Amount Reduction

The result of the analysis is that there are no stakeholders who occupy quadrant I because stakeholders do not carry out the implementation of the reduction in the number of KJA by themselves or are only carried out by one agency and can be said to require other stakeholders to carry out activities to reduce the number of KJA.

Stakeholders who are in quadrant II are a key factor in the implementation because they have strong driving force and dependency.

- TNI → Conducting the dismantling of KJA.
- PKJA → Conducting demolition due to the need for supervision by the owner of KJA which is being demolished.
- PD → Conduct demolition and as a guide for the KJA location to be demolished.
- BPWC → Movement as monitoring, supervision and data collection in the execution of KJA demolition.

Quadrant III is occupied by DKPP, in that quadrant has a weak driving force but the strength of dependence on the quadrant is strong. DKPP is in quadrant III because of the results of interviews with each stakeholder, DKPP is not present in the KJA demolition activities, however, it is very dependent on the results of the number of demolitions received from BPWC to be used as reports and data collection.

UPTD P3U, Office of Tourism, Office of Environment, Aspindac, MPC, Community Leaders, feed distributors and academics are in quadrant IV, where in the quadrant are included in the elements that have no influence on the

KJA demolition implementation activities. Stakeholders in quadrant IV can be used as aspirations and provide advice to key stakeholders to carry out KJA demolition activities to be more secure, orderly and good.

The reduction in the number of KJA in the Cirata Reservoir is divided into several stages, for the first stage the KJA demolition is carried out in July - December 2018, the second stage is January - December 2019 and then until 2023. The results of BPWC data regarding the number of KJA have been carried out in Maniis Subdistrict in August 2018 has reached 461 KJA plots from a total number of 20,222 plots, so that there has been a decrease in the number of KJA in Maniis Subdistrict by 3% and the amount to 19,761 KJA plots. The process of indirect disassembly is carried out, through data collection first, the determination of the date of the demolition implementation process along with the agreement with the KJA owner, then the KJA demolition process is carried out. The amount of KJA disassembled for each KJA owner is carried out in stages, not directly spent in its entirety (BPWC 2018).

Key Stakeholders Post KJA Reduction

For key factors after the reduction in the number of KJA, the absence of identified stakeholders became a key factor after reducing the number of KJA. Because the process of reducing the number of KJA is still ongoing and it can be said that the activity has just begun, so after conducting interviews with other stakeholders about who will be the key factor in the aftermath of the reduction in the number of KJA most of them are the government. This can happen because back to the government program, Citarum Harum, there was a reduction in the number of KJA, so many stakeholders who answered the key factor after the reduction in the number of KJA were the government as a form of responsibility after reducing the work area as KJA fish cultivators.

Preparation Of KJA Amount Reduction Strategy Scenarios

Scenarios can be arranged based on circumstances that may occur in the future on influential key factors (Hartrisari 2002). The scenario for reducing the number of KJA includes reduction based on ownership (active and non-active), location (close), number (exceeding rules, more than 20 plots) and condition (damaged or inactive).

Monitoring and evaluation are the most important aspects in the post-implementation phase of KJA reduction. Monitoring and evaluation is a program needed in sustainable KJA fisheries management in the Cirata Reservoir. If no strict supervision is carried out by the relevant agency on KJA business practices, it is not impossible to overcapacity KJA will re-occur due to the existence of illegal KJA (Widiyati 2009).

Operational Recommendation

Recommendations focus on influential stakeholders at each stage. The recommendations are prepared by combining the best possibilities that can be implemented by stakeholders in reducing the number of KJA in the Cirata Reservoir in the Maniis District District.

Socialization Phase

Table 2. Operational Recommendations for the Socialization Phase

No	Activity	Executor
1.	Collect all representatives of stakeholders in a forum or group.	BPWC, Koramil, Babinsa, MPC, Desa
2.	Making posters and leaflets on the activities of reducing the number of KJA and installing them in strategic places.	BPWC, DKPP, Desa
3.	Submission of the program plan is an activity to reduce the number of KJA, along with its impact.	DKPP, BPWC, Desa, MPC, TM, Koramil, Babinsa
4.	Strengthening reasons for reducing KJA is supported by statistical data	DKPP, BPWC

Implementation Phase

Table 3. Operational Recommendations for the Implementation Phase

No	Activiy	Executor
1.	Data collection on the number of KJA plots, KJA business owners, number of migrants and indigenous people, KJA conditions, and complaints of KJA business actors.	BPWC
2.	Determination of operating targets	BPWC
3.	Recommended reduction method	BPWC, Koramil, Babinsa
4.	KJA subtraction execution	Koramil, Babinsa, KJA Owner, Desa

Prospective Analysis Of Solutions From KJA Amount Reduction

The results of a prospective analysis of the solutions resulting from the interview process with stakeholders in the Maniis Subdistrict region are:

Table 4. Business Transfer / Professional Solutions

No	Business Transfer / Profession	Founder
1.	Transferring cultivation land to pond cultivation	DKPP, BPWC
2.	Fishing fisheries management	DKPP, BPWC
3.	Regular guidance and education for KJA business	DKPP, Desa
4.	Cooperation with investors in the context of empowering communities affected by KJA reduction	DKPP, Desa
5.	Bioflok Method Aquaculture	DKPP, BPWC Desa
6.	Development of Cirata Reservoir water tourism	Dinpar, BPWC
7.	Entrepreneurship training	BPWC, Desa

One alternative to anticipate the existence of a reduction in the number of KJA operating in reservoirs such as Cirata, is to encourage production from freshwater aquaculture that uses media other than KJA, in the form of ponds, jetted ponds or rice fields. Reduction of labor due to KJA rationalization will cause unemployment in rural areas around the reservoir (Suryana 2013).

CONCLUSION

Stakeholders who are the key factors for the success of the socialization of the reduction in the number of KJA are those in quadrant II, namely BPWC, Purwakarta Regency, MPC, Fisheries Agency and Village Leaders. Stakeholders who are the key success factors in the implementation of the reduction in the number of KJA are those in quadrant II, namely the Koramil, Babinsa, KJA Owners, Village Devices and BPWC.

Reducing the amount of KJA can be realized properly if it optimizes the role of influential stakeholders. The socialization of the KJA number reduction program must be followed by all stakeholders and delivered clearly so that it can be understood by all stakeholders or the community. The method of implementation must be carried out fairly and structurally, starting from reducing the number of KJA based on conditions (non-active), based on ownership (immigrants) and based on numbers (exceeding rules). The transfer of business provided by the government as a result of reducing the number of KJA such as pond cultivation, biofloc system cultivation and entrepreneurship training. More rigorous supervision is needed after the KJA reduction process is carried out in the Cirata Reservoir.

Recommendation given by the author while conducting research in the Cirata Reservoir in the Maniis District, Purwakarta Regency are:

- For Scientific: The need for further study to find out the analysis after reducing the number of KJA and further studies on the prospects for the number of KJA that have been dismantled or reduced.

- For Stakeholders: Stakeholders must play an active role in reducing the number of KJA, explaining in more detail to all KJA business owners, KJA workers and the community about the purpose of reducing the KJA program, the need for more supervision and security of activities to reduce the number of KJA in order to avoid conflict , soon the issuance of a clear and clear solution by the government to deal with the impact of reducing the number of KJA.

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References

- [1] Arikunto, S. 2006. *Prosedur Penelitian : Suatu Pendekatan Praktik*. Jakarta : Rineka Cipta.
- [2] [BPWC]. Badan Pengelola Waduk Cirata. 2018. Hasil Sensus KJA Terbaru. Waduk Cirata : BPWC.
- [3] Fauzi, A. 2004. *Ekonomi Sumberdaya Alam dan Lingkungan*. Jakarta : PT. Gramedia Pustaka Utama.
- [4] Hartrisari. 2002. *Panduan Lokakarya Analisis Prospektif*. Fakultas Teknologi Pertanian. Institut Pertanian Bogor.
- [5] Humas Kabupaten Purwakarta 2018.
- [6] Komarawidjaja, W. 2005. Status Kualitas Air Waduk Cirata Dan Dampaknya Terhadap Pertumbuhan Ikan Budidaya, *Jurnal Teknik Lingkungan*, Vol. 6 (1) : 268 – 273.
- [7] Suryana, A, A, S. 2013. Dinamika Total Factor Productivity Perikanan Budidaya Air Tawar Dan Dampaknya Terhadap Perekonomian Jawa Barat (*Disertasi*). Bogor. Institut Pertanian Bogor.
- [8] Widiastuti, M 2015. Analisis Kelembagaan Model *Agent Principle* Pada Petani Keramba Jaring Apung Di Waduk Cirata Jawa Barat. *Jurnal Agribisnis UNMUS*, Vol. 5 (2) : 70 – 89.
- [9] Widiyati, A. 2009. Analisis Faktor Penting Dalam Pengelolaan Perikanan Budidaya Keramba Jaring Apung Berkelanjutan Dengan Metode *Interpretatif Structural Modeling* Di Waduk Cirata Jawa Barat. *Jurnal Akuakultur* No. 4 Vol. 2 : 277 – 290.

