ECONOMIC FEASIBILITY ANALYSIS CRITICAL LAND MANAGEMENT IN PROJECT VCM (VOLUNTARY CARBON MARKET) (CASE STUDY IN JORONG SUBARANG KENAGARIAN PANINGGAHAN SOLOK DISTRICT)

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ABSTRACT:

Land and forest damage occurred in Nagari Paninggahan causes critical land area of 2.700 Ha. In order to repair the damage to forests and land and increase productivity and restore its function as protection for Watershed (DAS) Batur lake, one of the activities is Voluntary Carbon Market (VCM). VCM project is an investment of financial resources, social, physical and material. As an investment there is always a benefit or advantage that is expected either directly or indirectly. So the aim of this research is to analyze the economic feasibility of the critical land management in Jorong Subarang Kenagarian Paninggahan, Sijunjung Sirih subdistrict, Solok District. The research method is descriptive method which uses the case study. From 2010-2015, the area of 31,65 ha has spent Rp 1.371.923.020. The economic calculation of VCM project indicated from the results of the economic analysis of VCM that is 31.65 hectares with a 5-year analysis period at the interest rate of 12%, the B / C Ratio of 1,02, with NPW of Rp 18.533.726 and EIRR of 12,05%. It is due to the calculation of the economic benefits of externalities are not fully assessed quantitatively. A sensitivity analysis shows that the VCM project is sensitive to some effects of the changes, such as the effect of the increase of dollar exchange rate, the rise of inflation and the high cost of maintenance of plants in areas of critical land. VCM project sensitivity level is 2%. Although it is sensitive to the effects of changes, VCM Project has a positive impact on the community and environment as (1) reduce the critical land, so as to prevent the occurrence of fires, the air absorption of CO2 impact on the environment and add DTA, (2) provides a training for using herbicides and (3) Increase employment opportunities. The results of this research could be used as information for farmers on the improvement of degraded land and for the government as a basis for policy making and extension for VCM project development in the local area.

***Keywords**: Critical Land, Project VCM (Voluntary Carbon Market), Economic Feasibility*

Introduction

Nagari Paninggahan is one of the villages in the District of JunjungSirih and in the region around of Singkarak Like as shown in (Appendix 1), which has an area that enough wide forest of 3,848 hectares or 37,54% (Appendix 2) from the total area of NagariPaninggahan. NagariPaninggahan is one of the villages that a part of the territory have broken forest because because of the structure and land hilly and rocky such as limestone, so causing onset of critical area. This resulting in the erosion hazard level is large enough and have a major impact on the catcment area of Singkarak Lake so it looks the silting of the river as well as a decrease in the quality and quantity of water in the debt arrangement scheme NagariPaninggahan. Critical condition in NagariPaninggahan powered with one of the results of research has carry out by ICRAF (International Center For Research in Agroforestry) in 2004-2007 to suggests that the catchment area Singkarak Lake there are many critical area, including in NagariPaninggahan, so necessary to greening kind of rehabilitation. However, it is not easy to do for in local community, because need to the need big funds. Therefore, ICRAF help to presentation results of that research to several donors who are willing to work together to overcome that, inland and outland. Operate BV CO2 institutions interesting to establishing cooperation in Nagari Paninggahan through Clean Development Mechanism projects (CDM), which will be held contract in the 10-year. Then the project was amended to 5 years and changed its name become the Voluntary Carbon Trading (Voluntary Carbon Market, VCM). VCM is an investment amount of financial resources, social, physical and material implanted for productivity recovery efforts. Help to improve that critical land is with planting productive plants and woody plants. Productive plant such as cocoa (*Theobroma cacao L.*) And Mahogany (SwieteniamahagoniJacq), Pinang (*Areca catechu*), and Cinnamon (*CinnamomunZaylanicum*).

General investment will always be benefits or hoped function calculated function will expected, from the rehabilitation in VCM project thoroughly good benefit can be assessed directly by cash (tangible benefits) or which can not be assessed directly by cash with money (intangible benefits) which include forest plants that productive and immature (Widyastutik, 2010: 19).

Based on above description. So the question are whether the benefits provided from forest management in the Project Voluntary Carbon Market (VCM) and whether it is economically feasible in Jorong Subarang Kenagarian Paninggahan Junjung Sirih subdistrict Solok regency. To know the answer so do the research about the economic feasibility analysis, project management of critical land in the Voluntary Carbon Market (VCM) in Jorong Subarang Kenagarian Paninggahan Junjung Sirih subdistrict Solok regency.

Materials And Methiods

The method used in this research is descriptive method of the case study. This research was conducted as one month, ie on April 14 - May 14, 2015 at 28 samples of which farmers are members of the Project Voluntary Carbon Market (VCM) and a few key informants in Jorong Subarang Nagari Paninggahan, District Junjung Sirih, Solok District, West Sumatra.

Data was collected by interviewing a sample. The variable in this study is the economic feasibility of the management of critical land in the Project Voluntary Carbon Market (VCM), which calculated using investment criteria Benefit-Cost Ratio (B/C), Net Present Worth (NPW) and Economic Internal Rate of Return (EIRR). Primary data and secondary data collected will be analyzed by descriptive quantitative and qualitative with data period is during the project is five years from 2010-2015. Economic Feasibility Analysis Critical Stewardship Project Voluntry Carbon Market (VCM) by looking at the overall feasibility of the benefits of direct and indirect benefits.

Results And Discussion

District of Junjung Sirih is one of the districts in Solok regency in West Sumatra Province and consists of two villages is Muara Pingai and Nagari Paninggahan. Paninggahan Nagari is a village consisting of six Jorong that are (1) Gando, (2) Gantiang Padang Palak, (3) Village Tangah, (4) Koto BaruTambak, (5) Parumahan and (6) Subarang.

Has an area of 10,250 hectares, which consists of rice fields located in the village with an area of 718 hectares, settlements, forests and buildings are, etc. The topography of this area consists of lowland (9,045 Ha), hilly (782 hectares) and others (4,413 Ha). NagariPaninggahan has two major hills, is BatuAgung hill and JunjungSirih hill and has a very wide critical land an area of 2.700 hectares (NagariPaninggahan, 2012). North side NagariPaninggahan bordered by NagariMalalo District of Batipuh South Tanah Datar, the south side bordered by NagariMuaroPingai District of JunjungSirihSolok regency, East side bordered by Singkarak Lake subdistrict X Koto SingkarakSolok District and west side with Nagari Koto Tangah Padang City.

Analysis Of Investment Criteria

Table results of an assessment of the investment criteria of the VCM project in Table 9:

Table 9. Results of sensitivity analysis (Decrease Total Benefit 2% and 3%) At VCM Project

No	Investmant Criteria	Appraisal
1	B/C Ratio	1.02
2	Net Present Worth (NPW)	Rp 18,533,726
3	EIRR	12.05%

The present value (discounted)

Analysis of benefits and costs on the VCM project, the discount rate used to perform calculations among other B/C ratio, NPW and economic rate of return (EIRR). The goal is to make it easier to assess and calculate the value that is in the past and the future is then converted into the current value. The discount rate used is 12% on the year, because it accordance with the level of interest rates prevailing in the study area. According to the World Bank, the OCC (the discount rate) used by the State that is developing and growing in the amount of 12% on the year.

Benefit Cost Ratio

From the calculation B/C ratio and cost benefit analysis, based on the table 5 with an interest rate of 12% was obtained B / C ratio of 1.02, which means the net present value of the benefit is greater than the net present cost. Based on the criteria of the B/C ratio is greater than one, then the VCM project is feasible and means that every Rp 1, - the cost of which is invested will earn a profit of 0.02, - and the benefits of 1.02

NPW (Present Net Worth)

Benefit analysis and cost of VCM project with calculation NPW resulting value of NPW is Rp18,533,726,- with a discount rate of 12% per year. The results of the calculation of the NPW is positive, then the project is feasible because it would provide benefits.

EIRR (Economic Rate of Return)

From the calculation of the cost benefit analysis and calculation values obtained EIRR IRR of 12.05%. The amount EIRR can not be determined directly, to generate value EIRRs the interpolation with the discount rate, in this case the discount rate used is 12% and should be sought with menginterpolasikan two interest rate difference is not greater than 5% so as not to cause errors. By counting back now net benefit to get value EIRRs sebesar12,05%. Based on the analysis, categorized VCM project feasible. This is because the value of EIRR of 12.05% over besardari diccount rate in effect at the moment that is equal to 12% per year.

Sensitivity Analysis

Decrease Sensitivity Analysis Total Benefit

Table 10. Results of sensitivity analysis (Decrease Total Benefit 2% and 3%) at VCM Project

No	Kriteria Investasi	Appraisal	
		2%	3%
1	B/C	0.99	0.99
2	Net Present Worth (NPW)	Rp (37,760)	Rp (9,323,504)

3	Ecomic Internal Rate of Return (EIRR)	7.05%	2,05%

From the calculation of the benefit if there is a decrease of 2% VCM Project didapat B/C = 0.99 means that with Rp 1, costs incurred will acquire sebesar 0,99 losses. NPW value obtained Rp (37,760). This value indicates that during 5 years of critical land management Poyek VCM will get kerugiansebesar USD (37,760), -. If viewed from the external rate of return (EIRR) of this project does not layakkarena EIRR value amounted to 7.05% smaller than the discounted rate. This is because in the calculation of the economic feasibility analysis values the economic benefits of the project VCM externalities is not entirely assessed quantitatively.

Meanwhile, if there is a decrease in the Project VCM benefit of 3% obtained B/C = 0.99 means that with Rp 1, - costs incurred will acquire a loss of 0.99. NPW value obtained Rp (9,323,504), -. This value indicates that during 5 years of critical land management Poyek VCM will get a loss of Rp (9,323,504). If viewed from the external rate of return (EIRR) of this project is not feasible, because the value of EIRR of 2.05% smaller than rate. Hal discounted is because in the calculation of the economic feasibility analysis values externalities economic benefits of the project is not fully assessed VCM quantitatively.

Sensitivity Analysis Cost Increase 10%

Table 11. Results of sensitivity analysis (Total Cost Increase 2% and 3%) at VCM Project

No	Investment Criteria	Appraisal	
		2%	3%
1	B/C	1%	0.99
2	Net Present Worth (NPW)	Rp 332,914	Rp (8,767,492)
3	Ecomic Internal Rate of Return (EIRR)	12%	7.03%

From the calculation if there is an increase of 2% fee on the Project VCM obtained B/C = 1 means that the Rp 1, costs incurred project will not suffer loss or profit. Nilai NPW obtained sebesarRp 332,914. This value indicates that for 5 years Poyek VCM critical land management will have a loss of USD 332,914. If viewed from the external rate of return (EIRR) of this project is still feasible, because the value of EIRR of 12% is equal to the discounted rate.

Meanwhile, if there is an increase in project costs by 3% VCM obtained B/C = 0.99 means that with Rp 1, costs incurred will acquire a loss of 0.99. NPW value obtained sebesar Rp (8,767,492). This value indicates that for 5 years Poyek VCM critical land management will have a loss of USD (8,767,492). If viewed from the external rate of return (EIRR) of this project is not feasible, because the value of EIRR of 2% smaller than the discounted rate. This is because in the

calculation of the economic feasibility analysis values the economic benefits of the project VCM externalities is not entirely assessed quantitatively.

Sensitivity Analysis Decrease Increase Total Total Benefit and Cost

Table 12. Results of sensitivity analysis (Decrease Total Benefit 2% and 3% and Increase Cost 2% and 3%) at VCM Project

No	Investmant Criteria	Appraisal	
		2%	3%
1	B/C	0.98	0.95
2	Net Present Worth (NPW)	Rp (18,238,572)	Rp (51,521,959)
3	Ecomic Internal Rate of Return (EIRR)	7.02%	2%

From the calculation if there is an increase of 2% fee on the Project VCM obtained B/C = 0.98 means that with Rp 1, costs incurred project will not suffer a loss of 0.98. NPW value obtained Rp (18,238,572). This value indicates that for 5 years Poyek VCM critical land management will have a loss of USD (18,238,572). If viewed from the external rate of return (EIRR) of this project is not feasible, because the value of EIRR at 7.02% smaller than the value of the discounted rate.

Meanwhile, if there is an increase in project costs by 3% VCM obtained B/C = 0.95 means that with Rp 1, costs incurred will acquire a loss of 0.95. NPW value obtained Rp (9323504). This value indicates that for 5 years Poyek VCM critical land management will have a loss of USD (51,521,959) When viewed from the external rate of return (EIRR) of this project is not feasible, because the value of EIRR of 2% smaller than the discounted rate. This is because in the calculation of the economic feasibility analysis values the economic benefits of the project VCM externalities is not entirely assessed quantitatively.

From the study of sensitivity analysis of various conditions, management of critical land in VCM Project shows that the project is sensitifterhadap changes, such as the effect of the increase in the dollar exchange rate, the rise in inflation and the high cost of maintenance of plants in the area of land kritis.Tingkat VCM project sensitivity that is equal to 2 % .It is seen from the above calculation, that at the time of rise and decline of 2% benefit VCM project is still positive and still deserves to be continued because it would give advantage. However, the rate of increase and decrease in the cost benefit of 3%, from the calculation has been negative which means that the project VCM suffered losses.

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References

Arief, Arifin .2001. *Hutan dan Kehutanan*. Yogyakarta: Kasinius. 180 hal.

Fakhri, Ahmad .2013. *Analisis Finansial Perkebunan Sawo (AchrasZapota, L) Rakyat Di Nagari Sumpur Kecamatan Batipuh Selatan Kabupaten Tanah Datar [Skripsi]*. Padang. Fakultas Pertanian. Universitas Andalas. 94 hal

Gittinger, J. P. 1986. *Analisa Ekonomi Proyek-Proyek Pertanian*. Mangiri, K., Sutomo, S., penerjemah; Sri, Suwasono, E., penyunting. Jakarta: Universitas Indonesia (UI-Press). 579 hal.

Gray, C, et Al. 2005. *Pengantar Evaluasi Proyek*. Jakarta: PT Gramedia Pustaka Umum. 328 hal.

Kementrian Perdagangan Republik Indonesia. 2015. *NilaiTukar Mata Uang Asing Terhadap Rupiah*. http://www.kemendag.go.id/id/economic-profile/economic-indicators/exchange-rates. (21 Agustus 2015)

Nurmalina, R. dan Novianti, T. 2010. *Analisis Manfaat Biaya. Departemen Agribisnis*. Fakultas Ekonomi dan Manajemen.Institut Pertanian Bogor. Bogor. 177 hal.

Purba, Radiks. 1996. Analisis *Biaya dan Manfaat (Cost and Benefit Analysis)*. Bekasi: Rineka Cipta. 129 hal.

Suherman, A. Dault, A. 2009. Analisis Dampak Sosial Ekonomi Keberadaan Pelabuhan Perikanan Nusantara Brondong Lamongan Jawa Timur. *Jurnal Saintek Perikanan* 5 (1):25-30.