The Impact of Land Use Community Environment in Borders Indonesia – Malaysia

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Abstract. Entikong Sub-district in Sanggau District is one of the areas directly adjacent to Malaysia (Sarawak) and the first and oldest cross-border entrance in Indonesia. Different characteristics from other regions (factor of production immobilities, transaction costs and delays, different economic systems, institutional issues, zoning, and the role of the informal sectors) drive the region's economic is functioning internal also external. Economic perspectives in the border region are tend to increase. The overlapping of unclear land uses, causing the development of border areas to be improperly planned with the implications of natural resource degradation and environmental quality, and not achieving improved community welfare, dehumanization and deculturization processes, and macro leads to regional disintegration (especially Economically). The emphasis on this research is more on the environmental impacts of the Entikong border community making land change. The research objectives of this study identified the impact of land use change in the Entikong District border area to the community so that people can be more efficient and effective in protecting the environment. The analytical method used in the questionnaire survey used an *Adkins and Burke Scale Weight Checklist* impact questionnaire. This technique is an estimating environmental impact with scale made up to five. The impact components used are grouped into: either transportation, environmental, sociology, or economy. This method is very simple, in the form of a list of environmental components used to determine which components will be affected. First made a list of the various impacts that may be occured related to the planning and alternative plannuing. Sampling methods are made by purposive sampling methods based on the consideration of the researchers. Household unit sample is focused on the community that changed of the land. The results of this study is suggested by that land of using changes have a negative impact on environmental conditions biotic, abiotic, and community culture which is not good for environmental sustainability. The expected output from this research is to contribute the development of science in the field of environmental management and environmental management in particular sustainable land use.

1. Introduction

Entikong Sub-district in Sanggau District is one of the areas directly adjacent to the state of Malaysia (Sarawak) and is the first and oldest cross-border entrance in Indonesia. Different characteristics from other areas (factor production immobility, transaction costs and delay, different economic systems, institutional issues, zoning, and the role of the informal sector) encourage the region's internal and external economic functions. Economic perspectives in the border region tend to increase. By the above background, Entikong is the border region with the highest economic activity along the land border (West Kalimantan-Sarawak) [1]. The overlapping of unclear land uses, causing the development of

border areas to be improperly planned with the implications of natural resource degradation and environmental quality, and not achieving improved community welfare, dehumanization and deculturization processes, and macro leads to regional disintegration (especially Economically).

Entikong is a part of transportation services between Indonesia and Malaysia [2]. The growth and development of border area residents has shown a significant rate of increase, as the pace of development investment, especially in the plantation sector. Based on the real condition, research on land use issues will be conducted, with emphasis on the analysis on the environmental impacts of the community on land change. Study analysis in this research include scoring abbiotic biotic environment variable and Entikong society culture. The presence of more dominant land use interests than environmental considerations can lead to excessive land use without paying attention to its sustainability. So the impact that occurs in the form of degradation of environmental quality and quantity.

In the theory of land use process and its influencing factors [3]. There are six factors that influence the process of land use change, namely: (1) the physical characteristics of the land that is related to the physical condition of the land such as land topography, fertility, irrigation, (2) regulations concerning land use in relation to the designation of the land in accordance with existing regulations; (3) the personal characteristics of the land owner that is related to the socio-economic condition of the land owner; (4) many of the few public utilities that are related to the availability of more complete public facilities will further encourage land use change; (5) the degree of accessibility of land that is related to affordability or accessibility in and from other places, and (6) the initiative of the builders that is related to the area chosen to serve as the location of the development in large quantities.

Related scoring in the assessment in determining the assessment used the rating scale according to that has been modified that is divided into 5 classes that is very low, low, moderate, high, extreme [4]. The division of classes in this assessment is based on the divisions made by Fandeli, where in knowing the state of land carrying capacity is divided into 5 classes according to Government Regulation Number. 60 Year 2008 on Risk Assessment Elements.

From these problems lead to a decrease in the quantity and quality of the environment, especially in the community that owns the land and that changes the land, which raises the question of whether land use change in Entikong border area in accordance with the allotment of the environment?

This study explains the scores of unsuitable environmental impacts from land use with the conditions of the land to be immediately controlled.

2. Methods
The research is conducted by conducting field survey which intends to obtain the primary and secondary data needed. In this study the authors used a questionnaire to be distributed to the community, especially those who own and change the land. The experience and knowledge or knowledge of the people who changed the land use to the background of the respondents' general description, the presentation of research data. This research is also included in applied research, practical research, ie careful and systematic research or investigation of a problem with a purpose to be used for a particular purpose.

2.1. Data Collection Technique
Data collection was done to obtain data as input for the analysis phase. This form of stages is a direct survey activity in the study area (primary survey). The primary survey, conducted through interview surveys and direct questionnaires in the field.

2.2. Respondent Unit and Samples
Population in this research is Entikong society which own land and change land such as forest become agriculture, or from agriculture become plantation. To all sample of respondent respondents come from five villages, namely: Nekan, Semanget, Entikong, Sell Tembawang, and Pala Pasan. The total number of residents from five urban villages is 15,047 people. The unit in this study focused on Household Unit.

The number of samples will be determined based on the results of the calculation of the formula from Taro Yamane or Slovin [5] as follows:

$$n = \frac{N}{N.d^2 + 1} \tag{1}$$

Table 1. Sample Distribution Table of Household Unit

Village	Population	Calculation	Number of Household Sample	Target Sample (assumption)		Ring nearest major cross-border road
				Own land	Changing land	
Entikong	6.782	(6.782/15.047)x100	45.07 ~ 45	20	25	Ring 1
Semanget	2.188	(2.188/15.047)x100	14.54 ~ 14	7	7	Ring 2
Nekan	2.268	(2.268/15.047)x100	14,72 ~ 15	10	5	Ring 3
Pala Pasang	1.014	(1.014/15.047)x100	6.73 ~ 7	1	6	Ring 4
Suruh Tembawang	2.795	(2.795/15.047)x100	18.57 ~ 19	12	7	Ring 5
Amount		15.047	100 person	50 person	50 person	

Table 1 explained a sample distribution of household unit based on village (Entikong, Semanget, Nekan, Pala Pasang, Suruh Tembawang, and Amount). Total of population is 15.047 people,and there is 100 person that assumpted as a sample. 50 person for 'Own Land" sample, and 50 peson for "Changing Land" sample.

2.3. Sampling Method
The sampling method in the field was done by purposive sampling method which was non-random sampling, where the sample was chosen based on certain considerations from the researcher. Household sample is focused on people who change the land.

2.4. Research Variables
Based on the results of literature study [6] in Erik Meijaard and Douglas Sheill, Minister of Agriculture Decree No.837 / KPTSS / Um / 11/1980 and No. 683 / KPTSS / Um / 8/1981) obtained results that can be made as a variable Of environmental impact and sub criteria [7], as follows:
   a. Abundance and Diversity of Fauna
      • Loss of breeding grounds
      • Increased mortality due to competition
      • Increased hunting pressure
      • The emergence of new types of diseases
      • Increased animal predators
      • Loss of food
   b. Abundance and Flora Diversity
      • Extracting into the protected area
      • There is a logging waste that is discharged into the water body
      • Decrease in the number and types of protected trees
      • Number of burning land for plantation.
   c. Changes in Air Temperature
      • The loss of agricultural habitat is important because of changing air temperatures
      • Different working areas at dry season and cold temperatures during the rainy season
      • Decreased health due to changing temperature
   d. Speed Changes and Wind Direction
      • There is an increase in turbulence / wind speed from farmland / plantation
      • The fall of the old tree
      • The wind direction becomes changed
      • Landfire
   e. Changes Day / Rain Time
      • Rain time becomes unpredictable
      • The intense rainfall will cause crop failure due to flooding
      • Intensity of heavy rain will help in bringing illegal timber through the river
      • Trade mobility becomes disrupted due to heavy rain
   f. Changes in Air Quality and Pressure
      • Solar Radiation occurs, the heat surface causes many to be overgrown with trees

- Winds that tend to be large due to open land
- Disturbing Smoke and Dust
- Noise occurred

g. Changes in Water and Channel Quality and Quantity
- Lack of water supply at any given time
- Delayed distribution of clean water
- Contamination of groundwater with pollutants in the soil
- Water quality is less good
- Incremental cost due to the manufacture of water treatment system as an alternative solution
- Pollution of groundwater sources with septic tanks
- An absorption well that is not up to standard
- Damage to roads due to puddles and rainwater
- Changes in land surface characteristics, such as uneven, damaged, etc.
- Flood during the rainy season
- Damage to infrastructure (installation, utilization, facilities, etc.)
- Damage to vegetation in certain areas

h. Solid Waste Management
- TPS scenery is not good
- The emergence of a stinging smell
- Health problems arise
- Garbage that obstructs the water channel because it is scattered
- Waste collection at any given time

i. Transport Infrastructure and Traffic Management
- Road conditions are damaged and there are often improvements
- Increase in costs due to widening roads environment that is not enough volume again
- Additional costs due to alternative road construction
- Unavailability of mass transit
- Accidents in certain areas
- The condition of damaged external environmental infrastructure

j. The Shift of Customs
- Land changes carry implications for shifting customs
- Interruption of inter-religious communication.
- Loss of local culture due to modernization

k. Lifestyle and Values
- Social jealousy due to social layers.
- Security disturbances.
- Complaints about the condition of houses and materials that are not qualified, there needs to be a change.
- Complaints from the community and the value of compensation costs to the community.
- Decreasing the value of local wisdom

l. Ritual and Religious Activities
- Provision of infrastructure and additional facilities for religious purposes.
- Religious activities are still dominated by strong culture.
- There is friction or disharmony of religious rituals

2.5. Data Processing Technique
This study is based on a risk status management approach so that it follows the procedures and steps in risk status.Data processing includes:

2.5.1. Determining the probability/frequency framework of risk. Table 2. shows a rating and percentage for a determining probabilities framewoek of risk. 0-10% has a 1 rating value for a very small, certainly very unlikely to happen probabilities. And the biggest probabilities is upper than 90% for a very big, certainly will happen.

Table 2. Frequency framework of risk

Probabilities		Criteria
Rating	%	
1	0-10	Very Small, Certainly very unlikely to happen
2	10-30	Small, Small possibility can happen
3	30-50	Medium, Equally likely between occurring or not occurring
4	50-90	Large, Most likely can happen
5	>90	Very Big, certainly will happen

2.5.2. Determining Impact Measurement Framework. Table 3. shows an impact rating for a measurement framework. The lowest impact rating (1) is for a Not Significant, and no effect. The highest impact rating (5) is for a fatal, and the huge loss.

Table 3. Impact Measurement Framework

Impact Rating	Criteria
1	Not Significant, No effect
2	Small, medium loss
3	Medium, High loss
4	Big, big losses
5	Fatal, The loss is huge

2.5.3. Determining the Status of Risk. Table 4, explained the equation of Risk Status = Probability x Impact.

Table 4. Status of Risk

No	Variable	Frequency		Impact		Status
		%	Category	%	Category	
....	....	.....	....	....	....	....

2.5.4. Identify according to the risk profile map and create a 5x5 risk analysis matrix. Table 5, shows a risk analysis matrix.Scale 1for a very small frequency and not significant impact, and scale 5 for a very large frequency and fatal impact.

Table 5. Risk Analysis matrix.

Matrix Analysis 5 x 5		Impact				
		Not significant	Small	Medium	Large	Fatal
Frequency	Scale	1	2	3	4	5
Very large	5	5 (M)	10 (T)	15 (E)	20 (E)	25 (E)
Large	4	4 (R)	8 (M)	12 (T)	16 (E)	20 (E)
Medium	3	3 (R)	6 (M)	9 (M)	12 (T)	15 (E)
Small	2	2 (R)	4 (R)	6 (M)	8 (M)	10 (T)
Very small	1	1 (R)	2 (R)	3 (R)	4 (R)	5 (M)

Source : PP No.60 Year 2008 about Impact Rating element /Risk (Integrity Validation)

Table 6. Rating/Status

Description		Level	Level starts from status
Extreme	(E)	5	15
High	(T)	4	10
Moderate	(M)	3	5
Low	(R)	2	3
Low	(R)	1	1

Table 6. explained a rating/status, level starts from status are between 1 to 15, and the description is extreme, high, moderate, and low.

2.6. Method of Weighting (Scoring)
Weighting method (scoring factor) is a technique in analyzing data by making a value against existing circumstances, and arranged according to rankings that have been made before [8]. This assessment is based on the environmental impact criteria as a result of land use in the Entikong border region adjusted for the physical condition of the land. So this weighting yields the lowest value to the highest. In determining the appraisal used the scale of assessment according to modified Fandeli that is divided into 5 classes that is very low, low, medium, high, very high.

3. Results and Discussion

Results of this study can be seen at Table 7. With a tabulation level Extreme (E), High (T), Moderate (R), and Low (R). There is a variation of modus for each variable code. For a further explaination, it can be seen at a table below:

Table 7. Tabulation of Level/Rating Impact Analysis Results

Variable Code	Tabulation Level				Amount	Priority Modus	Explaination
	E	T	M	R			
A1	0	0	32	68	100	R	
A2	0	0	48	52	100	R	
A3	0	17	53	35	100	M	T=17
A4	0	0	43	67	100	R	
A5	0	8	49	43	100	M	T=8
A6	0	2	47	51	100	R	T=2
B1	13	21	39	27	100	M	E=13
B2	0	0	48	52	100	R	
B3	7	13	52	28	100	M	
B4	37	23	21	19	100	E	E=37
C1	0	0	58	42	100	M	
C2	0	6	43	51	100	R	T=6
C3	12	16	52	20	100	M	E=12
D1	0	13	52	35	100	M	T=13
D2	0	0	18	82	100	R	
D3	0	0	22	78	100	R	
D4	8	42	33	17	100	T	E=8
E1	0	16	36	48	100	M	T=16
E2	9	21	47	23	100	M	T=9
E3	0	0	43	57	100	R	
E4	0	22	48	30	100	M	T=22
F1	0	0	34	66	100	R	
F2	0	0	36	64	100	R	
F3	0	0	67	33	100	M	
F4	0	0	68	32	100	M	
G1	0	17	48	35	100	M	T=17
G2	0	12	54	34	100	M	T=12
G3	0	0	37	63	100	R	
G4	14	46	23	17	100	T	E=14
G5	0	0	23	77	100	R	
G6	0	0	42	58	100	R	
G7	0	0	59	41	100	M	
G8	0	0	66	34	100	M	
G9	13	47	22	18	100	T	E=13
G10	6	59	23	12	100	T	E=6
G11	8	32	37	23	100	T	E=8
G12	12	38	28	22	100	T	E=12
H1	0	28	44	28	100	M	T=28
H2	53	22	17	8	100	E	E=53
H3	16	39	27	18	100	T	E=16
H4	0	0	57	43	100	M	
H5	0	0	59	41	100	M	
I1	11	49	28	12	100	T	E=11
I2	0	0	43	57	100	R	
I3	0	0	42	58	100	R	
I4	0	13	48	39	100	M	T=13
I5	0	22	47	31	100	M	T=22
I6	0	0	43	57	100	R	
J1	0	13	46	41	100	M	T=13
J2	8	17	41	34	100	T	E=8
J3	0	0	44	56	100	R	
K1	0	0	42	58	100	R	
K2	0	0	62	38	100	M	
K3	0	19	58	23	100	M	T=19
K4	0	17	59	24	100	M	T=17
K5	0	0	46	54	100	R	
L1	0	0	49	51	100	R	
L2	0	0	63	37	100	M	
L3	0	14	57	29	100	M	T=14

Source: Analysis Results

By knowing the Status of Impact or Risk of 100 respondents, it can be known level or status of each variable and in addition to know what happens also will know what to do to cope and suppress the risk status for the environment as mention in Table 8.

Table 8. Discussion

What happened	What to do
Risk Status E (Extreme)	
Goals and results are not achieved	Management that is active and involving various stakeholders
Great environmental losses	Strategy must be implemented as soon as possible
Decreased land carrying capacity	An immediate and appropriate approach and regular reporting
Reputation of the area decreases so that the potential becomes lessened	Conducting a thorough evaluation involves all layers of interest
Risk Status T (High)	
Some goals and results are not achieved	Need active management and regular review
Huge environmental loss	Strategies should be implemented, especially focused on control
Decreased land carrying capacity	Approaching effectively
Simply lowering the reputation of the region but only part of the potential of the declining region	
Risk Status M (Moderate)	
Disrupt the quality or timeliness of the goals or results	Need to be managed and reviewed regularly
Loss of environmental economic value is sufficient	Need effective internal controls
Reduced capability of land carrying capacity	Monitoring is required
Only a few places that experienced a decline in reputation and even for a reasonable reason	Strategies must begin to be developed and implemented
Risk Status R (Low and Very Low)	
Disturbing the quality and quantity of goals and results	The routine procedure is sufficient to bear the impact need a quick monitoring
Financial losses from environmental economic valuations are not large / minimal	
The decline of regional reputation as a potentially damaged area is very small	Control is done normally is sufficient
	If not at all noticed, the risk may increase its status
	A monitoring strategy is needed

Source: Analysis Results

As a city that is prepared as one of the national strategic activities center of course Entikong need more information and data related to the state of its own region. From the data and information obtained and through further evaluation and analysis will sharpen the final information needed for the planning to be made. Each risk status level has it owns solutions as can be seen at table 8. For an extreme risk status, there is several recommendation such as : Management that is active and involving various stakeholders, Strategy must be implemented as soon as possible, An immediate and appropriate approach and regular reporting, and Conducting a thorough evaluation involves all layers of interest.

It difference with a low and very low risk status, the recommendation include a: The routine procedure is sufficient to bear the impact, need a quick monitoring, Control is done normally is sufficient, If not at all noticed, the risk may increase its status, and A monitoring strategy is needed

4. Conclusions

In the discussion described above, we have described the environmental impacts of land use on Entikong and surrounding areas. There are several environmental variables that lead to Extreme status such as the abundance and diversity of flora and fauna that are greatly reduced and even in some places lost due to unclear land use. Coupled with the unpredictable rainy season and unpredictable dry season, one of the causes of crop failure is that it forces people to clear land by burning to get the harvest up to twice a year.

Based on the risk status can be actually followed by risk mapping research in which the affected area will be more traceable and may soon be handled early on the environmental impact that would be occured.

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