LAND USE CONFLICT: A CASE STUDY FOR TAPAH AREA, SIBURAN SUB-DISTRICT, SARAWAK.

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# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACKNOWLEDGEMENT</td>
<td>i</td>
</tr>
<tr>
<td>TABLE OF CONTENTS</td>
<td>ii</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>vii</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>viii</td>
</tr>
<tr>
<td>LIST OF APPENDICES</td>
<td>ix</td>
</tr>
<tr>
<td>LIST OF PLATES</td>
<td>x</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>xi</td>
</tr>
</tbody>
</table>

## CHAPTER 1 INTRODUCTION

1.1 Background and Rational of Study 1

1.2 Study Area 3

1.3 Study Objectives 6

1.3.1 General Objective 6

1.3.2 Specific Objectives 6

1.4 Significance of Study 7

## CHAPTER 2 LITERATURE REVIEW

2.1 Global Population Increase and its Pressures Towards Our Environment 8

2.2 Global Water Consumption and Supply 9

2.3 Global Water Shortages 10

2.4 Importance of Forests Worldwide 11
### 2.5 Effects of Deforestation and Land Degradation in Asia

2.6 Watershed Management in Malaysia

2.7 National Agricultural Policy

2.8 State Agricultural Policy

2.9 Land Classification in Sarawak

2.10 Land Status and Availability of Land in Sarawak

2.11 Land use in Sarawak

2.12 Long-term Sustainable Development in Sarawak

2.13 Effects of Deforestation on River Systems in East Malaysia

2.14 Agricultural Activities and their Contributory Effects on Soil Erosion in the Steepland of Sarawak

2.15 Water Resource Management in Sarawak

2.16 Water Supply in Sarawak

2.17 Existing Laws Related to River Protection in Sarawak

2.18 River Water Quality Monitoring in Sarawak

2.19 Sources of River Contamination

2.20 Land Use Conflicts

### 3.1 Collection of Secondary Data

3.2 Field Surveys

3.2.1 Mapping of Existing Land Use

3.2.2 Water Sampling
CHAPTER 4 RESULTS & DISCUSSION

4.1 Environmental Profile
   4.1.1 Climate
      4.1.1.1 Temperature
      4.1.1.2 Wind
      4.1.1.3 Rainfall
   4.1.2 Vegetation and Forest Types
   4.1.3 Geology
   4.1.4 Soils and Agricultural Capability
      4.1.4.1 Topography
      4.1.4.2 Soil Types
      4.1.4.3 Agricultural Capability
      4.1.4.4 Limitations to Agriculture
   4.1.5 Existing Land Use
      4.1.5.1 Shifting Cultivation of Hill Paddy and Associated Crops
4.1.5.2 Wet Paddy 56
4.1.5.3 Rubber 57
4.1.5.4 Pepper 58
4.1.5.5 Fruits, Vegetables and Annual Crops 59

4.2 Land Use Conflict Indicators 61

4.3 Water Quality 61
  4.3.1 Water Quality Standards 61
  4.3.2 Water Quality Analysis Results 62

4.4 Tapah Water Treatment Plant 66
  4.4.1 Design Capacity 66
  4.4.2 Plant Operations / Processes 67
  4.4.3 Issues of Concern 68

4.5 Impacts from Land Use Conflicts 69
  4.5.1 Habitat Loss and Biodiversity Change 69
  4.5.2 Damage to Aquatic Habitats 70
  4.5.3 Soil Erosion 70
  4.5.4 Impacts on Surface Water 71
    4.5.4.1 Surface Runoff 71
    4.5.4.2 Water Pollution 73
    4.5.4.3 River Sedimentation 75

4.6 Possible Factors Causing Encroachments by Farmers 76
  4.6.1 Socio-economic Factors 76
  4.6.2 Physical Environmental Factors 77
  4.6.3 Government Policies 77
CHAPTER 5 CONCLUSION

5.1 General Conclusions 82
5.2 Water Quality 83
5.3 Limitations of the Study 84

CHAPTER 6 RECOMMENDATIONS

6.1 Minimizing Land Use Conflicts 86
6.1.1 Integrated Water Resource Management 86
6.1.2 Public Participation 87
6.1.3 Fallow Periods 88
6.1.4 Review of Existing Policies 88
6.2 Mitigation Measures for Soil Erosion 89
6.2.1 Correct Land Use 89
6.2.2 Control of River Bank Erosion 89
6.3 Other Recommendations 90
6.3.1 Sedimentation Ponds at Water Treatment Plant 90
6.3.2 Water Quality Monitoring 90

REFERENCES 91

APPENDICES

PLATES
LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>Locality Map</td>
<td>4</td>
</tr>
<tr>
<td>1.2</td>
<td>Study Area</td>
<td>5</td>
</tr>
<tr>
<td>2.1</td>
<td>Hydrologic Cycle</td>
<td>12</td>
</tr>
<tr>
<td>2.2</td>
<td>Changes in forestland cover in tropical regions, 1980-1990</td>
<td>14</td>
</tr>
<tr>
<td>4.1</td>
<td>Soil Map of Area</td>
<td>49</td>
</tr>
<tr>
<td>4.2</td>
<td>Agricultural Capability Map of Area</td>
<td>52</td>
</tr>
<tr>
<td>4.3</td>
<td>Land Use Map</td>
<td>79</td>
</tr>
<tr>
<td>4.4</td>
<td>Water Sampling Points</td>
<td>80</td>
</tr>
<tr>
<td>4.5</td>
<td>Water Treatment Process</td>
<td>81</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Table</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>Land Use in Sarawak</td>
<td>22</td>
</tr>
<tr>
<td>4.1</td>
<td>Land Capability Classes and their Limitations</td>
<td>51</td>
</tr>
<tr>
<td>4.2</td>
<td>Description of Water Sampling Points</td>
<td>63</td>
</tr>
<tr>
<td>4.3</td>
<td>Water analysis results 1</td>
<td>63</td>
</tr>
<tr>
<td>4.4</td>
<td>Water analysis results 2</td>
<td>64</td>
</tr>
<tr>
<td>4.5</td>
<td>Recommended Drinking Water Quality Standards</td>
<td>67</td>
</tr>
<tr>
<td>4.6</td>
<td>Surface Runoff Estimations</td>
<td>72</td>
</tr>
</tbody>
</table>
LIST OF APPENDICES

A  Interim National Water Quality Standards for Malaysia  
   (DOE, 1993)

B  Water Analysis Result 1

C  Water Analysis Result 2
# LIST OF PLATES

<table>
<thead>
<tr>
<th>Plate</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plate 1</td>
<td>Sungai Tapah</td>
</tr>
<tr>
<td>Plate 2</td>
<td>Tapah Water Treatment Plant</td>
</tr>
<tr>
<td>Plate 3</td>
<td>Aerial Photo of Area</td>
</tr>
<tr>
<td>Plate 4</td>
<td>Jalan Padawan</td>
</tr>
<tr>
<td>Plate 5</td>
<td>Kampung Mundai</td>
</tr>
<tr>
<td>Plate 6</td>
<td>Hill Padi</td>
</tr>
<tr>
<td>Plate 7</td>
<td>Fruit Garden</td>
</tr>
<tr>
<td>Plate 8</td>
<td>Water Sampling at WS2</td>
</tr>
<tr>
<td>Plate 9</td>
<td>Water Sampling at WS3</td>
</tr>
<tr>
<td>Plate 10</td>
<td>Water Sampling Point WS4</td>
</tr>
<tr>
<td>Plate 11</td>
<td>Water Pumping Station</td>
</tr>
<tr>
<td>Plate 12</td>
<td>Intake Pipes</td>
</tr>
<tr>
<td>Plate 13</td>
<td>Dam at Water Treatment Plant</td>
</tr>
<tr>
<td>Plate 14</td>
<td>Laboratory at Water Treatment Plant</td>
</tr>
<tr>
<td>Plate 15</td>
<td>Example of a Sedimentation Pond</td>
</tr>
</tbody>
</table>
ABSTRACT

The goal of the study was to identify the impacts of land use conflicts on the water quality of Sungai Tapah sub-catchment, Siburan Sub-district, Kuching, Sarawak. Data were collected by visiting various Government departments, private agencies, informal interviews, literature search, and field visits to the study area.

At present, 15 water catchment areas have been gazetted under the provision of the Water Ordinance, 1994. The Natural Resources and Environment Board (NREB) have approved another 17 water catchment areas for gazettlement, which is also devising a policy for introducing guidelines on permitted activities within water catchment areas. Although no agriculture is allowed in water catchment areas, encroachment by small-scale farming and shifting cultivation occurs in the study area, thus creating land use conflicts. Many concur that shifting cultivation is one of the main causes of siltation and river sedimentation in the State, particularly when appropriate fallow periods are not practiced.

Results from the water quality analysis indicated a higher level of suspended solids and turbidity during the first sampling (high tide and after rainfall), as compared to the second sampling conducted during low tide and no rainfall prior...
to the sampling. This is indicative of surface runoff and the lack of groundcover to prevent it from reaching the waterways. In general, the water samples taken from Sungai Tapah are acceptable. However, this is not the case for the discharge water from the water treatment plant (sample WS3). The level of suspended solids and turbidity are considered Class V of the Interim National Water Quality Standards for Malaysia (INWQSM).

Therefore, the protection of our water supply should be of highest priority. Currently, shifting cultivation is not under any form of regulation, thus has the potential to cause adverse environmental impacts due to the vastness of these areas in the State. An integrated approach, whereby social, economic and environmental dimensions are taken into consideration, is used to formulate effective strategies and management frameworks for water resources management in order to tackle this problem.
ABSTRAK

Sasaran kajian ini adalah untuk mengenalpasti impak daripada konflik guna tanah ke atas kualiti tadahan kecil Sungai Tapah, di daerah kecil Siburan, Kuching, Sarawak. Data dikumpul daripada lawatan ke jabatan-jabatan kerajaan, agensi-agensi swasta, melalui temurahah tidak formal, hasil kajian bahan bacaan dan lawatan lapangan ke kawasan kajian.

Sehingga kini, terdapat 15 kawasan tadahan air yang telah digazet dan termaktub di bawah Ordinan Air 1994. Lembaga Sumber Asli dan Persekitaran (NREB) telah meluluskan 17 kawasan tadahan air bagi tujuan penggazetan, yang juga dalam perancangan polisi untuk memperkenalkan panduan bagi aktiviti-aktiviti yang dibenarkan dalam lingkungan kawasan tersebut. Walaupun pertanian adalah tidak dibenarkan di kawasan tadahan air, namun pertanian berskala kecil dan pertanian pindah wujud di kawasan kajian, oleh yang demikian, mengakibatkan konflik guna tanah. Ramai yang berpendapat bahawa pertanian pindah merupakan salah satu punca utama pemendakan dan pengeladakan sungai di negeri ini, terutamanya apabila tempoh tanah terbiasa tidak dipraktikkan dengan betul.
Keputusan analisis kualiti air daripada persampelan pertama iaitu pada ketika air pasang dan selepas hujan menunjukkan paras bahan terampai dan kekeruhan yang tinggi berbanding persampelan kedua iaitu pada ketika air surut dan tiada hujan berlaku sebelum persampelan. Ini menandakan terdapatnya hakisan tanah dan kurangnya tanaman tutup bumi yang mencegah hakisan daripada sampai ke laluan air. Secara umumnya, sampel air Sungai Tapah yang diambil boleh diterima. Walau bagaimanapun, ini tidak termasuk air buangan daripada loji perawatan air (sample WS3). Paras bahan keladak dan kekeruhan adalah dalam Kelas V bagi Piawaian Sementara Kualiti Air Nasional Malaysia (INWQSM).

Oleh itu, perlindungan ke atas bekalan air kita haruslah diberi keutamaan yang tinggi. Pada masa kini, pertanian pindah tidak dinantikan dalam mana-mana peraturan dan oleh yang demikian, pertanian pindah yang berleluasa di negeri ini berpotensi untuk mengakibatkan impak buruk kepada persekutaan. Untuk menyelesaikan masalah ini, pendekatan integrasi yang mengambil kira dimensi sosial, ekonomi dan persekutuan adalah perlu untuk merangka strategi dan rangka kerja pengurusan yang efektif.
CHAPTER ONE

1 INTRODUCTION

1.1 Background and Rational of Study

Sarawak is the largest of the 13 states in Malaysia and covers a large area of approximately 12.3 million hectares, with a lengthy scenic coastline of 720 kilometers. The advantage of having large tracts of land means that Sarawak is able to cater for agricultural needs while maintaining a large forest resource base. Currently, some 390,000 ha of land is cultivated with perennial crops such as coconut, cocoa, rubber, oil palm and sago; whereas another 104,000 ha are cultivated with non-tree crops particularly pepper and wet and hill paddy or rice (Forest Department Sarawak, undated).

Besides large tracts of land, Sarawak is blessed with a large number of rivers, thus, referred by some as a 'land of rivers'. There are 23 major river basins in the State, a majority of which originates from the mountains of the Indonesian border (Memon and Murtedza, 1999). However, the problem arises when encroachments by small-scale farming occurs within watershed areas. For example, the recent trend is that small-scale crop cultivation continues to encroach into marginally suitable lands or land designated as water
catchment areas, thus resulting in serious soil erosion, which is also due to the inconsistencies between actual land use and land capability of the area (Natural Resources and Environment Board, 2002a).

In general, a watershed is defined by the stream that drains it. It is simply the area that collects and discharges runoff through a given point on a stream. The term is often used synonymously with drainage basin or catchment (Satterlund and Adams, 1992). Land development within catchment areas has had an adverse impact on the quantity, quality and distribution of water resources in Sarawak (Memon and Murtedza, 1999).

As the need to protect and conserve water catchment areas in the State increases, 15 water catchments have been gazetted, which consists a total area of approximately 3,700,000 hectares under the provision of the Water Ordinance, 1994. The Natural Resources and Environment Board (NREB) have approved another 17 water catchment areas (an estimated 1,100,000 hectares) for gazettement, which is also devising a policy for introducing guidelines on permitted activities within water catchment areas (Memon and Murtedza, 1999). Although no agriculture is allowed in water catchment areas, some include villages around which shifting agriculture is carried out, thus creating land use conflicts. According to Memon and Murtedza (1999), siltation, a non-point source of pollution, is a major cause of river pollution in Sarawak, of which, shifting agriculture has been identified as one of the main causes. The problem escalates when shifting cultivators claim to have cleared
the lands prior to 1959, whereby their lands are classified as Native Customary Rights (NCR) Lands (Natural Resources and Environment Board, 2002a).

This case study intends to discuss the nature of land use conflicts in the study area and present several recommendations on ways to minimize the impacts of these conflicts. For this case study, land use conflicts are indicated by the deterioration of water quality in the study area.

1.2 Study Area

The main focus is on the Sungai Tapah sub-catchment area, located within the Siburan Sub-District, Kuching Division (Figure 1.1). It is located approximately between latitudes $1^\circ 16'\ N - 1^\circ 18'\ N$ and longitudes $110^\circ 20'\ E - 110^\circ 24'\ E$ (Figure 1.2). Sungai Tapah (Plate 1) is also the main intake point for the Tapah Water Treatment Plant (Plate 2), which supplies treated water to the surrounding settlements.

The study area is easily accessible, whereby its main town, Tapah Bazaar, with a population of 2,518 people (Department of Statistics, 2002) is located at Mile 20 of the Kuching-Senan Road (Plate 3). Further access into the study area is via Jalan Padawan (Plate 4).
Almost all of lands within the study area are classified Interior Area Land. However, small areas of Mixed Zone Land exist, particularly along the Kuching-Serian road.

Sungai Tapah is actually part of the Batang Samarahan basin. This river basin has a total area of 1,088 km² and consists of two catchments, both of which are primarily drained by the Batang Samarahan. The upper catchment includes Pasar Pang Kut, Siburan, Beratok, Tapah and Kota Samarahan, whereas, the lower catchment is relatively narrow and runs from Kota Samarahan to the sea. Flash flooding occurs frequently in this area, mainly due to poor drainage and outlet systems (State Government of Sarawak, unpublished).
Generally, in the upstream of Sungai Tapah, extensive smallholding agricultural development has taken place. In particular, the study area is where the production of vegetables for Kuching occurs. Sadly, Sungai Tapah is overgrown with vegetation and siltation is a problem that needs to be addressed in order to ensure continuity of river flow and capacity.

There is only one settlement within the study area, namely, Kampung Mundai (Plate 5). This settlement consists of 120 households, with a total population of 624 people, of which all are Land Dayaks / Bidayuh (Mr. Colif, Siburan Health Clinic, personal communication).

Figure 1.2: Study Area
1.3 Study Objectives

1.3.1 General Objective

The general objective of the study is to identify the land use conflicts and its impacts on water quality in the study area.

1.3.2 Specific Objectives

The specific objectives are as follow:

(a) To map existing land capability and land use patterns in the study area;

(b) To identify land use conflict indicators;

(c) To identify the impacts of land use conflicts towards the water quality of Sungai Tapah;

(d) To explore major factors that contribute to land use conflicts in the study area; and

(e) To make recommendations on how land use conflicts can be minimized.
1.4 Significance of the Study

The protection of the water supply to the settlements within the study area is a matter of highest priority. However, it must be understood that water catchments do not pose an absolute constraint on all development, but rather, development and activities must be carefully controlled and monitored.

Thus, the significances of this study are as follows:

(a) The study will give us an overall picture of the land use conflicts in the study area;
(b) The study will provide indicators for land use conflicts and the resulting ecological and social problems, particularly with regards to water quality issues; and
(c) The study will provide recommended planning tools towards minimizing land use conflicts and hence, improve the quality of water supply in the area.
CHAPTER TWO

2 LITERATURE REVIEW

2.1 Global Population Increase and its Pressures Towards Our Environment

In 1992, the human population of the Earth as a whole passed a significant milestone: 5.4 billion individuals. The difference between birth and death rates during this year amounts to an annual worldwide increase in human population of approximately 1.7 percent. In 2000, the world's population reached approximately 6.2 billion and is expected to increase another 2 billion during the following 20 years. All these people consume a lot of food and water, use a great deal of energy and raw materials, and produce much waste. As a group, they also have the potential to solve many, perhaps most, of the problems that arise in an increasingly crowded world (Raven et al., 1993).

The need for consumables will increase exponentially in the foreseeable future in response to an increase in population. Human numbers have the potential for doubling once again well before the middle of the next century. We shall be drawing upon the resources and services of a finite, impoverished landscape for meeting those needs, as well as the need for a stable and secure
environment (World Commission on Forests and Sustainable Development, 1999).

2.2 Global Water Consumption and Supply

Worldwide, we are using increasingly more water, in part because our population is increasing and in part because, on average, each person is using more water. The World Resource Institute estimates that water use has increased 4 to 8 percent each year since 1950 (Raven et al., 1993). The rate of increase is now slowing because water use has stabilized in developed nations, although it is still increasing in developing countries.

To meet the growing need for water, we try to augment our supply by building dams to create reservoirs and by diverting river water. In many areas, the quantity of water is not as critical as its quality, and steps must be taken to ensure a supply of clean water. All of these efforts to obtain and maintain a steady supply of clean water involve considerable expense.

Data on global water availability and use indicate that, overall, the amount of fresh water on the planet is adequate to meet human needs, even taking population growth into account. These data do not, however, consider the distribution of water resources in relation to human populations (Raven et al., 1993).