

10-3 プロジェクトコストのまとめ

各道路建設比較案に対するプロジェクトコストを経済価格に変換し、比較案毎に表10-9に示されるようにとりまとめた。何れも設計費、建設費、維持管理費を含むものであり、本線のみならず関連フィーダー道路の建設費をも含んでいる。

段階建設時に際して、道路の耐用年数を20年として、計測期間の最終年次に残存価値を一括計上した。詳細はAppendix Table A-10-3に示される。

Table 10-9 Summary of Project Cost
Alternative Development Plans A-1 to C-3

Year	Alternative Case											
	A-1	A-2	A-3	B-1	B-2	B-3	B-4	B-5	B-6	C-1	C-2	C-3
1980	1,564	1,651	1,766	548	591	648	862	894	936	591	548	648
1981	2,372	2,503	2,677	836	901	987	1,310	1,357	1,421	901	836	987
1982	61	61	61	22	22	22	37	37	37	22	22	22
1983	39,753	41,969	44,902	13,922	15,016	16,465	21,922	22,718	23,801	15,016	13,922	16,465
1984	79,504	83,938	89,802	27,843	30,034	32,932	43,844	45,436	47,600	30,034	27,843	32,932
1985	39,753	41,969	44,902	14,938	16,076	17,583	22,624	23,475	24,631	15,643	14,528	17,121
1986	747	722	547	1,903	1,957	1,958	1,414	1,489	1,535	1,302	1,282	1,259
1987	747	722	547	388	376	289	376	367	303	380	392	293
1988	747	722	547	26,189	27,299	28,695	18,183	19,594	21,380	16,290	15,767	16,952
1989	747	722	547	52,019	54,250	57,131	36,012	38,845	42,481	32,243	31,173	33,644
1990	747	722	547	26,189	27,299	28,695	18,183	19,594	21,380	16,728	16,177	17,414
1991	1,213	1,188	1,013	1,213	1,188	1,013	1,213	1,188	1,013	1,678	1,662	1,591
1992	764	739	564	764	739	564	764	739	564	580	598	450
1993	764	739	564	764	739	564	764	739	564	11,583	11,020	12,192
1994	764	739	564	764	739	564	764	739	564	22,585	21,441	23,936
1995	764	739	564	764	739	564	764	739	564	11,583	11,020	12,192
1996	764	739	564	764	739	564	764	739	564	739	764	564
1997	1,958	1,935	564	1,958	1,935	564	764	739	564	1,935	1,958	564
1998	2,818	2,798	597	2,818	2,798	597	764	739	564	2,798	2,818	597
1999	4,863	4,950	652	4,863	4,850	652	2,464	2,442	518	4,850	4,863	652
2000	863	850	762	863	850	762	787	765	610	850	863	762
2001	863	850	762	863	850	762	787	765	610	850	863	762
2002	8,323	8,323	762	863	850	762	5,582	5,568	480	850	863	762
2003	964	964	964	863	850	762	2,890	2,879	686	850	863	762
2004	-7,504	-7,504	964	-28,001	-29,136	-27,674	-23,908	-25,335	-20,369	-40,248	-38,526	-39,553
Total	184,923	193,650	196,705	154,920	162,551	166,425	159,930	167,251	173,001	150,634	143,560	153,970

10-4 プロジェクト評価

10-4-1 経済分析結果

表10-10は、各道路計画案について、表10-8と表10-9に示される費用と便益を割引率8%で割引き、1985年時点の現在価値を求め、これらと比較したものであり、表10-11は同様に割引率を10%とした時の結果である。これらから次のようなことが言える。

- 1) 一括施工案は、何れも内部収益率8%以下であるのに較べ、2段階施工案では約9~9.5%、3段階施工案では約10%内外となる。従って、経済的には段階建設によることが望ましく、2段階よりは3段階で建設する方がより経済的である。しかし、2段階施工を3段階施工にすることによって得られる増加便益額は、一括施工を2段階施工にす

ることによって得られるそれより小さい。

2) 2段階建設計画案の中で、B1、B2、B3のグループと、B4、B5、B6のグループとの間には、経済的には殆んど差がない。

3) 何れの比較案でも砂利道よりも表面処理道、舗装道路の方が経済的に有利であるとの結果がでていますが、殆んど差はなし。これは次の2点の理由による。

第1は、ここで言うところの砂利道は既存の砂利道路のようなタイプではなく、第7章の7-5項の図7-4に示される舗装構造からアスファルトコンクリート層をとっただけの規格の高いタイプであり、表面処理道についても同様である。従って舗装タイプによるコストの差が小さいことである。

第2は、交通量タイプ別の便益額に示されるように、舗装タイプによって大きく変化するのは通常交通量の便益だけであり、その他の交通量の便益は殆んど変わらない。全便益の中で通常交通量の便益の占める割合が小さいため、舗装タイプによる比較案の間の便益の差も小さい。通常交通量以外の交通量の便益が舗装タイプによって殆んど変わらないのは、例えば転換交通量の場合のように、河川輸送コストと道路輸送コストとの間の差が道路舗装タイプの相違による道路輸送費用間の差に較べてはるかに大きいためである。

従って、経済評価の結果だけでは、適当な舗装タイプの選択は行えないと判断される。

Baram河のLong Lamaにおける架橋、又はフェリーの導入に関する経済分析の結果は、Appendix Note A-10-2に詳細に示されているが、経済的にはフェリーよりも橋梁による渡河の方が有利である。

Table 10-10 Results of Economic Analysis for Alternative Construction Plans (Discount Rate: 8%)

Analysis Case	Cost	Benefit					Present Value (at 1985: M\$000)		
		Normal	Diverted	Development	Induced	Total	IRR (%)	B/C Ratio	NPV (B-C)
A-1	188,002	10,381	74,849	24,041	69,510	178,781	7.45	0.95	-9,220
A-2	197,690	16,960	77,225	24,805	73,373	192,363	7.69	0.97	-5,327
A-3	205,616	23,556	79,205	25,443	77,233	205,437	7.92	0.99	-1,179
B-1	142,802	10,381	69,537	15,077	60,967	155,962	9.07	1.09	13,160
B-2	150,673	17,185	71,624	15,529	64,380	168,719	9.39	1.12	18,046
B-3	158,209	23,558	73,488	15,935	67,792	180,772	9.62	1.14	22,564
B-4	154,831	10,381	69,626	24,041	64,899	168,947	9.03	1.09	14,116
B-5	162,210	15,001	71,835	24,805	68,512	180,153	9.24	1.11	17,943
B-6	170,202	19,715	73,671	25,443	72,110	190,940	9.34	1.12	20,738
C-1	129,793	10,381	69,537	15,077	54,848	149,843	9.83	1.15	20,050
C-2	136,979	17,185	71,624	15,529	57,920	162,259	10.17	1.18	25,280
C-3	143,745	23,358	73,488	15,935	60,988	173,969	10.41	1.21	30,224

Table 10-11 Results of Economic Analysis for
Alternative Construction Plans
(Discount Rate: 10%)

Analysis Case	Cost	Benefit					IRR (%)	B/C Ratio	NPV (B-C)
		Normal	Diverted	Development	Induced	Total			
A-1	190,241	8,843	63,880	19,950	58,341	151,014	7.45	0.79	-39,227
A-2	200,163	14,485	65,908	20,583	61,582	162,559	7.69	0.81	-37,603
A-3	210,067	20,119	67,598	21,113	64,822	173,652	7.92	0.83	-36,415
B-1	139,247	8,843	58,695	11,930	50,331	129,798	9.07	0.93	-9,449
B-2	147,089	14,653	60,456	12,287	53,148	140,545	9.39	0.96	-6,544
B-3	155,079	20,121	62,029	12,608	55,965	150,723	9.62	0.97	-4,356
B-4	153,386	8,843	58,785	19,950	53,939	141,517	9.03	0.92	-11,869
B-5	160,666	12,594	60,651	20,583	56,942	150,771	9.24	0.94	-9,895
B-6	168,852	16,412	62,202	21,113	59,933	159,660	9.34	0.95	-9,192
C-1	125,946	8,843	58,695	11,930	45,106	124,573	9.83	0.99	-1,373
C-2	133,080	14,653	60,456	12,287	47,632	135,029	10.17	1.01	1,948
C-3	140,261	20,121	62,029	12,608	59,155	144,914	10.41	1.03	4,653

10-4-2 感度分析

プロジェクト実施の経済的妥当性の安定性を確かめるために、感度分析を下記のケースについて、最も経済効果の大きい道路計画案C-3案とC-2案について行った。

- 1) コストの増減：±0%～±20%
- 2) 誘発交通量の便益：+10%～-30%

以上の分析結果は、図10-1に示されるものであり、例えば本プロジェクト(C-3案)は、コストが20%増加しても、あるいはコストが10%増加し、誘発交通量の便益が20%低減しても、なお、内部収益率8%を保つことが示される。C-2案もC-3案と基本的に同様の傾向を示している。

10-4-3 プロジェクト道路区間の実施プライオリティ

本項では下記の道路区間について実施の経済効果を推定している。

- (1) Miri/Bintulu 道路 - Long Lama
- (2) Long Lama - G. Mulu Junction
- (3) G. Mulu Junction - Limbang

これらの区間の経済効果を測定するために次の表10-12に示されるD-1からD-6までの道路建設計画案を作成した。

各代替案毎に、交通量予測から経済分析を行った。その結果はAppendix Table A-10-6に示され、結果はAppendix Table A-10-4とA-10-5に基づいている。以上から各道路区間の建設による経済効果は表10-13に示されるものとなる。

Fig. 10-1 RESULTS OF SENSITIVITY ANALYSIS FOR THE SELECTED ALTERNATIVE CONSTRUCTION PLAN OF C-2 AND C-3 CASE

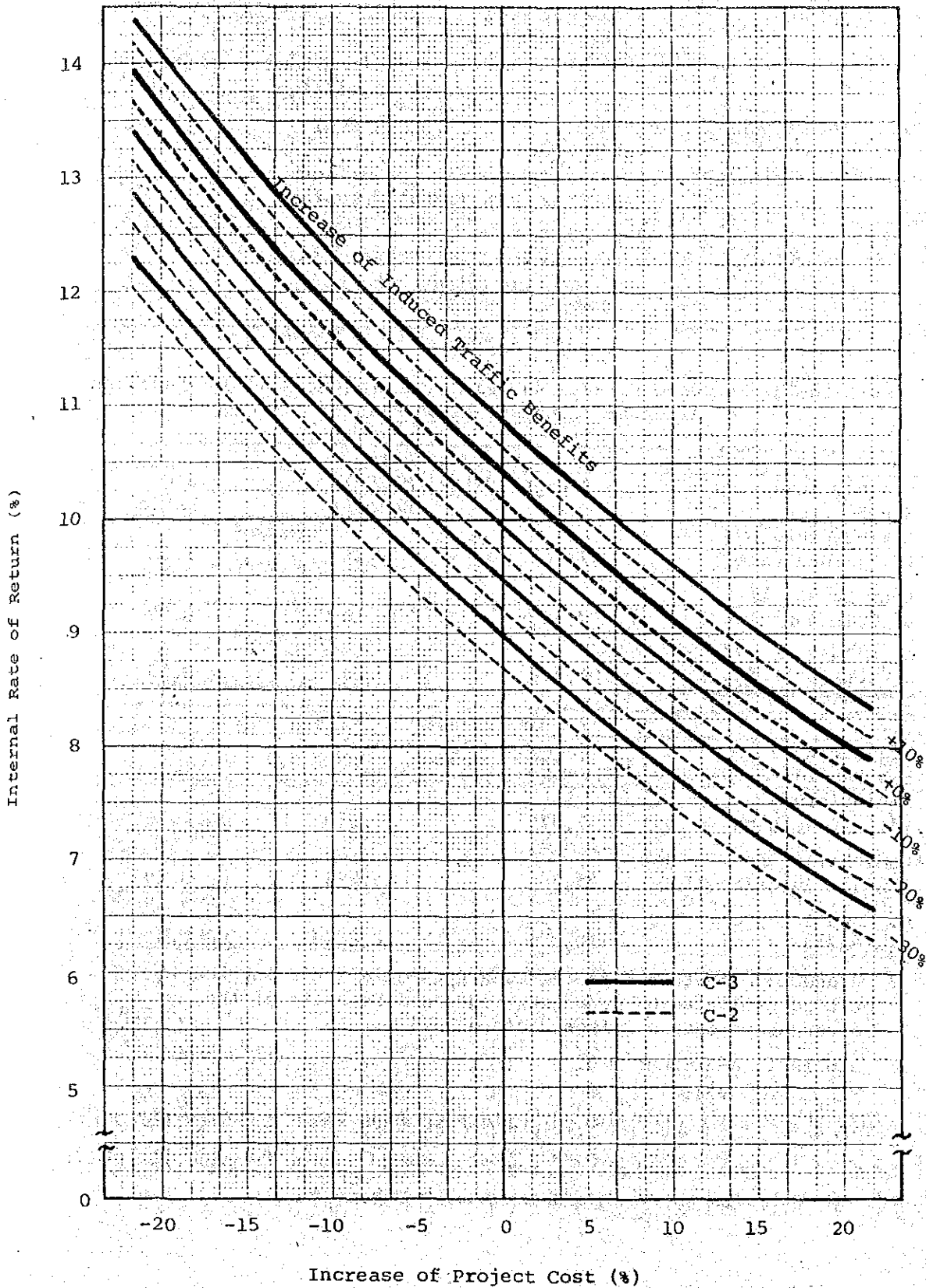


Table 10-12 Alternatives for Project Road Development Plans

Sub-Section to be Constructed	Construction Stage	Type of Road Surface	Code of Alternative
Miri/Bintulu Rd. to Long Lama Only	One Stage: Whole sub-section is to be opened for traffic in 1985	Gravel	D-1
		Surface Dressing	D-2
		Bituminous Surfacing	D-3
Miri/Bintulu Rd. to G. Mulu Junction Only	Two Stages: 1st stage: Miri/Bintulu Rd. to Long Lama (1985) 2nd stage: Long Lama to G. Mulu Junction (1990)	Gravel	D-4
		Surface Dressing	D-5
		Bituminous Surfacing	D-6

Table 10-13 Economic Effects due to Major Project Road Sub-Sections for Alternative Construction Plan of C-3 Case

Project Road Sub-Section	8% of Discount Rate		B/C Ratio
	Present Value (M\$000)		
	Cost	Benefit	
Miri-Bintulu Rd. - Long Lama	47,662	88,160	1.85
Long Lama - <u>1/</u> G. Mulu Junction	47,885	44,072	0.92
G. Mulu Junc. <u>2/</u> - Limbang	104,898	55,511	0.53

Project Road Sub-Section	10% of Discount Rate		B/C Ratio
	Present Value (M\$000)		
	Cost	Benefit	
Miri-Bintulu Rd. - Long Lama	47,975	74,650	1.56
Long Lama - <u>1/</u> G. Mulu Junction	45,386	35,693	0.79
G. Mulu Junc. <u>2/</u> - Limbang	110,027	48,295	0.44

1/ economic effects due to the construction of this sub-section can be estimated by deducting costs and benefits of the alternative case D-3 from those of D-6.

2/ similarly A-3 minus D-6.

上表は、プロジェクト全体が Miri/Bintulu 道路 - Long Lama 区間の高い経済効果によって支えられていることを示している。Long Lama - G. Mulu Junction 区間がこれに次ぎ、G. Mulu Junction 以遠の区間の経済効果は非常に小さい。

10-4-4 プロジェクト実施によるその他の便益

1) 概要

プロジェクトの実施は、以上までで検討してきた便益以外にも様々な、社会・経済的インパクトを地域に及ぼす。道路建設による諸効果には道路の規格、性格や地域の条件によって数多くのものがあげられるが、本プロジェクトの実施によってもたらされる便益は、主として次表10-14にまとめられるものである。特にプロジェクトエリアの大部分の地域では、従来、道路が全くなく、水運と限られた航空路しかないために、コミュニティ間のアクセシビリティが悪い上、行政サービス、地域開発政策の実施も充分に行われなかったことを考えれば、経済的な便益以外にも少なからぬ社会的・行政的便益がプロジェクト実施によってもたらされることに充分留意する必要がある。但し、こうした便益は相互に重複し、又、殆んどが計量できないものが多いが、以下各項目についてもう少し詳細に検討を加える。

表10-14 プロジェクト実施によってもたらされるその他の便益

(1) 輸送時間の短縮	
(2) 輸送の安全性、確実性の増大	
(3) 資源開発効果	
(4) 産業開発効果/地域開発効果	
(5) コミュニケーション機会の増大	
(6) 地域住民の社会福祉水準の向上	
(7) 政府の行政活動の効率化	
(8) 地域住民の連帯感の強化	
(9) 国家・地域住民のセキュリティの増大	

2) 輸送の合理化

プロジェクト道路の建設によって、直接道路利用者にもたらされる便益で、走行費用の節約、輸送時間の短縮、輸送の安全性・確実性の増大、交通快適度の増大、荷傷みの減少と梱包費の節約、運転手の疲労度の軽減等があげられるが、この中で特に着目すべき点は、既に述べた走行費の節約を除けば、輸送時間の短縮と輸送の安全性、確実性の増大の2点であろう。

(1) 輸送時間の短縮

第4章の4-3-2項で分析したように、プロジェクト道路の実現によって、プロジェクトエリア内の主要地域相互間の旅行時間は大巾に短縮される。次表10-15は主要地域間の旅行時間をプロジェクト道路の有る場合と、無い場合について簡略にまとめたものである。例えばプロジェクトエリアの主要な交通発生源のひとつである。

Long Lamaと、この地域の中心都市である、Miriとの間では、輸送距離で46% (245 Kmから132 Kmへ)、輸送時間で58% (9.9時間から4.1時間へ)の短縮になる。河川輸送の場合には、輸送時間も不確実であることから、プロジェクト道路建設による輸送時間の短縮は更に大きなものとなる。

Table 10-15 Comparison of Travel Time Between Major Zones of the Project Area for "With" and "Without"

Traffic Zone Pair	"Without" Project					"With" Project					Estimated Reduction			
	Distance (km)				Travel Time (Hrs.)	Distance (km)				Travel Time (Hrs.)	Distance		Travel Time	
	Road	Express Boat	Long Boat	Total		Road	Express Boat	Long Boat	Total		(km)	(%)	(Hrs.)	(%)
1. Miri - 5. Sg. Dekong	25	75	52	25+127	6.8	69	-	-	69	2.2	83	54.6	4.6	68.0
	25	148	66	25+224	10.7	107	-	-	107	3.3	132	55.2	7.4	68.8
	25	112	-	25+112	4.5	69	37	52	158	6.7	Δ21	Δ15.3	2.4	Δ52.1
	25	220	-	25+220	9.9	132	-	-	132	4.1	113	46.1	5.8	58.3
	25	220	123	25+343	18.1	132	-	132	255	12.3	113	30.7	5.8	31.9
	25	168	86	25+254	13.0	187	-	-	187	5.8	92	33.0	7.2	55.2
5. Sg. Bakong - 6. Sg. Tinjar	-	73	118	191	10.9	38	-	-	38	1.2	153	80.1	9.7	89.1
	-	37	52	89	4.7	63	108	-	171	7.4	Δ82	Δ92.1	2.7	Δ56.8
	-	145	52	197	10.1	63	-	-	63	2.0	134	68.0	8.1	80.5
	-	145	175	320	18.3	63	-	123	186	10.2	134	41.9	8.1	44.4
	-	93	138	231	13.2	118	-	-	118	3.7	113	48.9	9.5	72.1
6. Sg. Tinjar - 7. Miri	-	36	66	102	6.2	25	108	-	133	6.2	Δ31	Δ30.4	0	0.3
	-	72	66	138	8.0	25	-	-	25	0.8	113	81.9	7.2	90.3
	-	72	189	261	16.2	25	-	123	148	9.0	113	43.3	7.2	44.6
	-	20	152	172	11.1	80	-	-	80	2.5	92	53.5	8.6	77.5
7. Marudi - 8. Long Lama	-	108	-	108	5.4	-	-	-	-	-	-	-	-	-
	-	108	123	231	13.5	-	-	-	-	-	-	-	-	-
	-	56	86	142	8.5	55	108	-	163	7.1	Δ21	Δ14.8	1.4	16.5
8. Long Lama - 9. Upper Baram	-	-	123	123	8.2	-	-	-	-	-	-	-	-	-
	-	52	86	138	8.3	55	-	-	55	1.7	83	60.1	6.6	79.4
9. Upper Baram - 10. Sg. Tutoh/Apoh	-	52	209	265	16.5	55	-	123	178	9.9	83	31.8	6.6	40.0

Source: Based on the Table 4.10.

(2) 輸送の安全性・確実性の増大

プロジェクト道路の建設は、更に、プロジェクトエリア内の輸送の安全性・確実性を著しく高める。例えば、Limbang 港は、特に Landas (モンスーン) シーズン期間、港口の浅瀬のために、船舶の入港が困難になり、しばしば不可能となる。あるいは、このために船舶の転覆、座礁に至るケースも記録されている。プロジェクト道路の建設は、しかしながら第4章で検討したように Miri-Limbang 間の輸送費用、輸送距離を短縮、節減するものではないが、この主要2都市間に信頼できる代替交通路を提供するものであり、経済的にも社会的にも重要な意義を持っている。

又、プロジェクトエリアの河川網はよく発達しているが、幹線水路として、通年、比較的大型の船舶の利用に耐えるのは、事実上 Baram 河だけであり、Baram 河の

主要支流河川である Tutoh 河、Apo 河でも洪水期には棧、ロングボートの通行に支障をきたしている。

(3) 生産、輸送計画の合理化

道路の建設によってもたらされる走行費の節約、輸送時間の短縮からなる外部経済効果は、生産者に対しては生産計画の合理化を、輸送業者に対しては車輛の大型化等にもとづく輸送計画の合理化を可能にする。流通過程が合理化されることによって、在庫投資の節減、倉庫施設の減少も可能となる。

3) 資源開発効果／産業開発効果

プロジェクトエリアの資源開発は、本プロジェクト実施の重要な目的のひとつである。第 2 章と第 4 章で詳しく述べているように、道路建設によってプロジェクトエリア内の農業、林業、観光資源の開発が促進される。要約すれば、農業については、対象地域の特殊性（少ない人口、自然条件、現在の農業技術、流通機構等）からみて、道路が実現しただけで開発が急速に進むとは考えられないが、①政府主導型の各種開発、普及計画の導入は今までよりはるかに効果的に、かつ経済的に行えるようになり、農業開発ポテンシャルが相当量顕在化する。② Limbang Valley の開発も計画道路の実現に直接影響されるわけではないが、現在不安定な港湾と Brunei を経由する陸路（一部フェリー区間あり）しかないため、計画道路が完成することによって新たな信頼度の高い代替輸送路が確保されることは、生産物、原材料の輸送上大きな利益である。③道路を利用した新たな流通チャネルができることで、地域住民の農産物市場が拡大し、特にゴム、胡椒等換金作物の生産量の増大が期待できる。

林業については、計画道路が完成しても、大部分の原木は水量の豊富な Baram 河を主たる輸送路として、いかだで運ばれると予想される。しかし、Baram 河の林業開発がより上流へ、あるいは Baram 河の支流へと進行しており、現在でも一部地域では本流まで相当距離を道路で運んだり、水量の不足のためにスムーズに輸送されない場合も多く、計画道路の完成によって新たな開発が可能になる所もある。

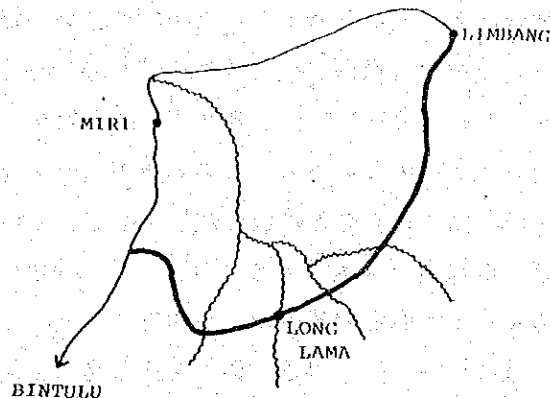
プロジェクトエリアは、特殊な自然条件のために一般観光客は容易にはアクセスできなかったが、その反面、貴重な生態系、景観、自然資源があるがままに保たれている。計画道路の完成は、既に詳しく述べたように、G. Mulu の国立公園、Loagan Bunut Lake 地域、Baram 河流域をはじめとする様々な観光対象への接近、利用を可能にする。こうした資源の価値は、単に地域住民のレクリエーション対象のみならず、国際的にも一級の水準にあり、広く国際観光市場を対象としうるものである。

鉱物資源の賦存の可能性についても、各種の報告があるが、何れもアクセスが悪いため、十分な調査が行なわれなかった。プロジェクト道路の完成によって、この地域の上記以外の各種資源の開発のためのより詳細な調査が可能になり、新たな開発の機会が発見されるかも知れない。

4) 地域社会整備

プロジェクトエリアは、特殊な自然条件に加えてインフラ整備が不十分で、教育、医療、通信等の公共サービス、社会福祉サービスの水準は非常に低い。特に、計画道路の新設区間が通過する Baram 地域での遅れが顕著である。河川に沿って散在する小規模なコミュニティに対して、例えば、学校、医療施設を建設するにしても、建設コストが非常に割高になるだけでなく、維持管理にも多大の費用と時間を要し、かつこうした所へ赴任する人材も十分に集まらない、といった問題があるため、Long Lama を、サブ・リージョナル・センターとして整備する計画も、道路がないために殆んど前進していない。プロジェクトエリアのコミュニティが河川に沿って分布しており、河川系統毎のコミュニケーションは比較的容易ではあるが、そうでない場合は困難である。計画道路はこうした河川系統を相互に結ぶため、計画道路の完成によって計画道路を幹線とし、河川をディストリビューターとする補完関係が強化され、効果的な交通システムが整備される。従って、従来の交通幹線

である河川と、計画道路の交点には各河川流域を影響圏とする開発拠点/サービスセンターの開発整備が可能となる。先に述べた Long Lama は、プロジェクトエリアの中の最大の河川との交点にあたる所に位置し、計画道路の完成によって、Baram 流域開発の拠点として発展することが予想される。



河川流域を相互につなぐような道路の建設は、従来、交流のなかった地域間に新たなコミュニケーションの機会を発現させるもので、これによって商取引機会や公共施設の相互利用機会が増大し、ひいては地域住民の連帯感の強化にもつながる。

5) サバ - サラワク縦貫道路

サバ、サラワクの2州は、現在、道路で結ばれていないが、長期的にはこれを幹線道路で連結することが、ひとつの政策目標となっている。

計画道路は、現在欠落している Miri から Limbang を経て Lawas に至る区間の前者にあたり、計画道路の完成によって Limbang - Lawas 間約 145 Km だけが残される。サバ、サラワク州が道路で直接連結されることによる経済効果は、必ずしも十分なものとは思われないが、社会的、政治的な意義は充分に考慮されるべきであろう。

10-4-5 結論と提案

以上の分析結果から、本調査の結論は下記の通りとなる。

- ① Miri/Bintulu道路から Limbangに至るプロジェクト全体は、間接的な便益も考慮すれば、経済的に充分フェージブルである。本プロジェクトの特色として、社会的、行政的な便益が非常に大きく、この点は十分に考慮されなければならない。
- ② プロジェクト全体の経済効果は、しかしながら特に大きくはないことから、より効果的な投資を行うために、全線を3段階に区分して経済効果の高い区間から下記の順序で実施することが望ましい。

○ 第1段階：Miri/Bintulu道路 - Long Lama 区間は経済効果も非常に高く、現道区間の改良も含めて1985年に供用開始をする。尚、Limbang-N. Medamit道路に関しては、特にLimbang市街地に近いLimbang-Kubong Junction間は交通量も多く早急に改良されることが望ましく、これ以外の区間についても、1985年に供用開始をすることとする。

○ 第2段階：1990年までにLong Lama - G. Mulu Junction区間を建設する。

○ 第3段階：1995年までにG. Mulu Junction - N. Medamit区間を建設する。

第2段階以降の実際の建設スケジュールは、プロジェクトの進捗状況やプロジェクトエリアの各種開発計画の進捗状況を十分に考慮し、計画の調整を行いながら決定されるべきである。

- ③ Bg. Baramの橋梁は、プロジェクト道路がG. Mulu Junctionまで建設された時点で大部分の交通量が発生してくるため、第2段階で建設を行う。

- ④ プロジェクト道路は、技術的、財政的側面を考慮して当初Surface Dressing道路で建設し、アスファルト舗装は交通量が増加した区間から漸次行うことが望ましい。Road Note 3.1の基準に従って、8.2トン換算通過軸数が50万回を超えると予想される時点で、アスファルト舗装にする。各セクション毎に下記のように想定される。

Table 10-16 Estimated Year for Bituminous Surfacing of the Project Road

Road Section	Estimated Year of Bituminous Surfacing	ADT in the Respective Year
Miri/Bintulu Rd. - Beluru	1998	1,330
Beluru - Sg. Tinjar	2000	920
Sg. Tinjar - Bg. Baram	2000	1,010
Bg. Baram - Sg. Tutoh	2003	510
Sg. Tutoh - N. Medamit	2003	410
N. Medamit - Kubong Junc.	1999	1,130
Kubong Junc. - Limbang	1985	1,804

- ⑤ 関連フィーダー道路の建設は、本線の建設スケジュールにあわせて行うべきであり、次表のように想定される。

Table 10-17 Construction Schedule of Project Road

Feeder Roads	Length (Km)	Relevant Project Road Section	Proposed Construction Timing
Long Laput Road	5.7	Sg. Tinjar - Bg. Baram	1983 - 85
Long Bedian Road	23.4	Bg. Baram - Sg. Tutoh	1988 - 90
Long Panai Road	11.4	- do -	1988 - 90
Long Terawan Road	4.7	- do -	1988 - 90
G. Mulu Access Road	4.6	- do -	1988 - 90
Total	49.8		

⑥ 以上のプロジェクト実施計画に則った必要な投資額は、下記の通りである。

Table 10-18 Cash Flow Schedule of Project Cost^{1/}

Year	Trunk Road			Feeder Road			Total (M\$000)		
	Foreign Component	Local Component	Total	Foreign Component	Local Component	Total	Foreign Component	Local Component	Total
1980	346	278	624	14	12	26	360	290	650
81	518	429	947	21	18	39	539	447	986
82	-	26	26	-	-	-	-	26	26
83	8,782	7,081	15,863	358	308	666	9,140	7,389	16,529
84	17,562	14,160	31,722	716	616	1,332	18,278	14,776	33,054
85	9,038	7,327	16,365	461	397	858	9,449	7,724	17,223
86	383	384	767	154	133	287	537	517	1,054
87	-	34	34	-	-	-	-	34	34
88	6,494	6,262	12,756	2,618	2,253	4,871	9,112	8,515	17,627
89	12,988	12,523	25,511	5,235	4,506	9,741	18,223	17,029	35,252
90	6,758	6,463	13,211	2,618	2,253	4,871	9,376	8,716	18,092
91	397	302	699	-	-	-	397	302	699
92	-	1	1	-	-	-	-	1	1
93	6,722	5,106	11,828	-	-	-	6,722	5,106	11,828
94	13,445	10,213	23,658	-	-	-	13,445	10,213	23,658
95	6,722	5,106	11,828	-	-	-	6,722	5,106	11,828
96	-	-	-	-	-	-	-	-	-
97	770	752	1,522	-	-	-	770	752	1,522
98	1,314	1,284	2,598	-	-	-	1,314	1,284	2,598
99	2,616	2,555	5,171	-	-	-	2,616	2,555	5,171
Total	94,855	80,286	175,141	12,195	10,496	22,691	107,050	90,782	197,832

1/ Maintenance costs are excluded

⑦ 道路建設に併行して沿線地域の開発計画を具体化し、道路の有効利用を積極的に図るべきである。下記の諸点がこれに含まれる。

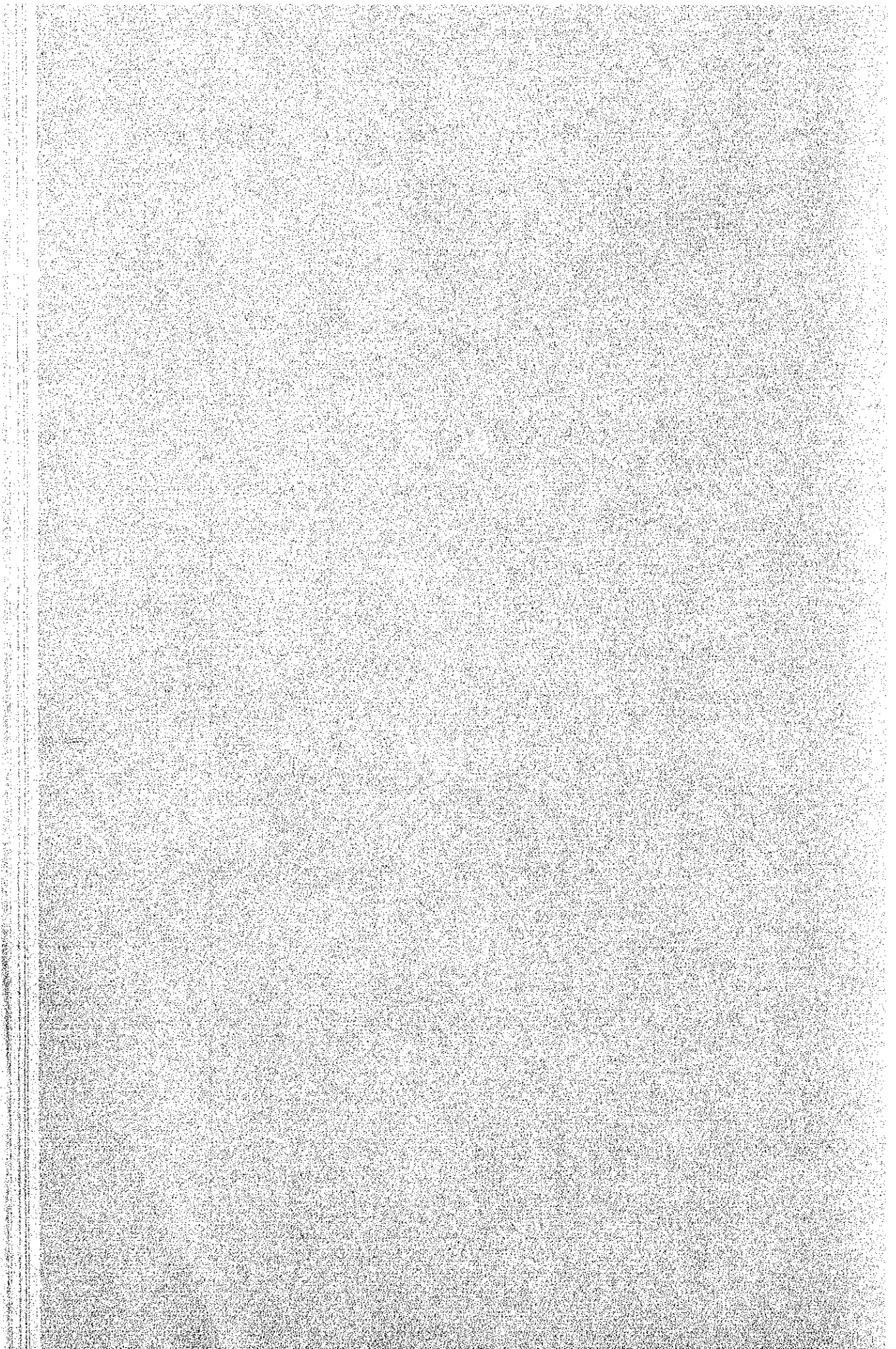
a) Long Lamaの Sub-regional Centre としての整備計画の具体化

Study Areaの大部分を占めるBaram河川流域の幹線水路であるBaram河は、プロジェクト道路が完成しても、依然この地域の重要な交通路であることに変わりはない。

Long Lamaはプロジェクト道路とBaram河の交点に位置し、Long Lamaを内陸部の戦略的な地域開発拠点として育成することは極めて重要であり、Long Lamaの果すべき役割は下記の諸点にある。

- 農・林業ポテンシャルエリア開発のためのサービス拠点
 - 教育、医療、コミュニケーション等の行政サービス拠点
 - 消費物資、農林業生産物の物流拠点
- b) G, Mulu 公園利用計画の具体化
- G, Mulu の観光資源価値は国際的にみても非常に高い水準にある。プロジェクト道路の完成によって、相当数の入込客が予想される上に、G, Mulu の観光資源には生態学的にデリケートな性質を持つものが多く含まれているため、プロジェクト道路の進捗にあわせて、綿密な利用計画、保全計画が具体化されなければならない。
- c) プロジェクト道路沿線の農業開発適地の計画的開発
- フィーダー道路を含むプロジェクト道路の沿線地域には、相当の農業開発適地が存在する。放置すれば焼畑農業に侵蝕されることは必定であり、沿道地域の政府主導による計画的開発が望まれる。但し、沿道地域には主としてその地形的条件のため、大規模開発に適した箇所は少ないため、開発タイプの決定には今後尚十分に調査が必要である。
- d) 沿道地域の主要コミュニティの整備
- Long Lama 以外にもフィーダー道路で結ばれる主要コミュニティの整備、拡大、近代化を推進する。
- e) Study Area 全体の観光開発計画の推進
- プロジェクト道路の実現によって、Study Area に散在する Miri、Niah Cave、Loagan Bunut、Baram 流域の各種観光資源、G, Mulu 国立公園、Limbang 更には Brunei 等の観光対象は一体化に連結される。これらの諸資源には、域内のみならず国際的な観光対象になり得るものも多く、前記 G, Mulu 国立公園とあわせて、この地域の総合的な観光開発の推進が望まれる。

資料編



Appendix Table A-1-1 Sarawak Gross Domestic Product and per Capita GDP, 1967-1975

Sector	1970 Prices										Average Annual Growth Rate (%)			
	1967	1968	1969	1970	1971	1972	1973	1974	1975	1967-1975	67-70	67-73	70-75	
Agriculture, Forestry and Fishery	267	305	343	319	292	282	327	-	355	2.0	6.7	1.0	3.1	
a) agriculture/livestock				168										
b) forestry/logging				133										
c) fishery				18										
Manufacturing	69	73	77	77	66	62	50	-	92	-0.1	3.9	-5.0	2.6	
Building and Construction	43	44	41	45	49	51	55	-	68	5.9	0.7	4.4	8.4	
Commerce	191	210	233	222	256	279	294	-	270	5.2	5.7	7.2	3.8	
a) transport/communication	37	42	50	31	63	72	78	-	57	7.3	-3.5	13.5	10.1	
b) whole sale/retail trade	90	103	117	125	126	135	143	-	138	5.6	11.5	7.5	2.5	
c) banking/insurance	11	12	13	13	14	17	18	-	17	6.5	6.0	8.4	6.0	
d) ownership of dwellings	53	53	53	53	53	55	55	-	58	1.1	0.0	0.7	1.9	
Services	140	141	145	127	150	170	176	-	210	5.3	-2.6	4.0	10.0	
a) public administration/defence	44	45	45	45	46	62	62	-	63	5.7	0.7	6.2	7.8	
b) electricity/water	9	9	10	12	12	14	15	-	22	11.6	10.2	9.7	13.3	
c) services	87	87	90	70	92	94	99	-	125	4.3	-6.0	2.0	10.8	
Sub-total	710	773	839	790	813	844	902	-	995	3.6	4.1	3.1	4.9	
Mining and Quarrying	2	7	16	30	114	155	152	-	157	77.1	144.8	112.8	31.0	
Grand Total	712	780	855	820	927	999	1,054	1,177	1,152	6.5	5.3	6.5	7.3	
Population (Mid-year Estimates)	901,663	923,592	944,029	967,274	994,535	1,022,382	1,063,300	-	1,102,956	2.6				
Per. Capita GDP (M\$)	790	845	906	889	932	977	991	-	1,044	3.3				
Annual Rate of Growth														
a) GDP (%)	9.6	9.6	0.6	7.8	7.8	7.8	5.5	4.5						
b) Per Capita GDP (%)	7.0	7.2	-1.9	4.8	4.8	4.8	1.4	2.6						

Source: State Planning Unit, Sarawak

Appendix Table A-1-2 Exports of Major Commodities, Sarawak

Commodity Section	(Unit of Measurement)	1975		1977	
		Quantity	Value (M\$000)	Quantity	Value (M\$000)
0. Food		53,234	111,323	58,145	155,255
(1) White Pepper	(ton)	9,644	39,041	7,363	42,494
(2) Black Pepper	(ton)	20,229	61,854	19,432	90,208
(3) Sago Flour	(ton)	22,306	5,305	29,717	8,312
(4) Prawns, Fresh and Frozen	(ton)	855	5,123	1,633	14,241
2. Crude Materials Inedible		-	161,779	-	405,816
(1) Sawlogs	(H. ton)	696,989	63,729	3,470,109	254,200
(2) Sawn Timber	(H. ton)	170,823	62,184	231,589	88,755
(3) Rubber	(ton)	28,579	35,866	37,665	62,861
3. Mineral Fuels		4,398,306	1,025,319	5,387,587	1,423,247
(1) Petroleum, Crude and Partly Refined	(ton)	3,963,204	917,292	4,995,242	1,310,089
(2) Petroleum Products	(ton)	435,102	108,027	392,345	113,158
4. Animal/Vegetable Oils and Fats		8,007	8,293	16,538	24,645
(1) Coconut Oils, Crude and Refined	(ton)	3,717	4,128	2,198	3,976
(2) Palm Oil	(ton)	3,592	3,887	12,497	19,620
(3) Palm Kernel	(ton)	698	278	1,843	1,049
6. Manufactured Goods			33,157		60,867
(1) Wooden Mouldings and Moulded Board	-	-	8,764	-	16,182
(2) Wooden Dowels	-	-	13,286	-	27,870
(3) Chipwood	-	-	8,588	-	9,327
(4) Veneer Sheets: max 1/5" thick	(⁰⁰⁰ sq.ft.)	544	37	n.a.	n.a.
(5) Plywood Plain; 5mm	(⁰⁰⁰ sq.ft.)	16,211	2,482	2,901	7,488
Total of Major Exports	-	-	1,339,871	-	2,070,912
Other Exports	-	-	47,524	-	82,336
TOTAL			1,387,395		2,153,248

Source: Preliminary Figures of External Trade, Dept. of Statistics

Appendix Table A-1-3 Import Commodity Division and Section

		(M\$ million)	
Commodity Section/Division		1975	1977
0	Live animals, other pets and animals for zoos	1.71	1.43
1	Meat, edible offal and meat preparations	7.16	10.13
2	Daily produce and birds' eggs	19.71	23.41
3	Fish and other marine animals, except mammals and preparations thereof	9.61	11.81
4	Cereals and cereal preparations	67.14	89.91
5	Fruits and vegetables	13.27	15.96
6	Sugar, sugar preparations and honey	31.36	33.35
7	Coffee, tea, cocoa, spices and manufactures thereof	4.91	7.12
8	Feeding stuffs for animals, excluding unmilled cereals	21.60	32.32
9	Miscellaneous food preparations	6.18	8.70
0*	FOOD AND LIVE ANIMALS	182.65	234.15
11	Beverages	11.29	16.18
12	Tobacco and tobacco manufactures	27.25	35.51
1*	BEVERAGES AND TOBACCO	38.54	51.69
21	Hides, skins and furskins, undressed	-	-
22	Oil-seeds, oil-nuts and oil kernels	3.81	3.98
23	Crude rubber and similar natural gums and synthetic rubber	0.04	0.09
24	Wood	11.12	23.04
25	Paper-making material	0.36	0.27
26	Textile fibres and waste	0.45	0.68
27	Crude fertilizers and minerals other than fuels and precious stones	4.99	5.50
28	Metallic ores and concentrates	0.17	0.06
29	Crude animal and vegetable materials, inedible	1.44	1.55
2*	CRUDE MATERIALS, INEDIBLE, EXCEPT FUELS	22.38	35.17
32	Coal, coke and related fuels	0.05	0.02
33	Petroleum and petroleum products	140.69	123.72
34	Gas	1.62	1.40
3*	MINERAL FUELS, LUBRICANTS AND RELATED MATERIALS	142.41	125.14
41	Animal oils and fats, unprocessed	0.48	0.40
42	Vegetable oils and fats, unprocessed	1.89	2.08
43	Animal and vegetable oils and fats, processed and waxes of animal or vegetable origin	0.03	0.04
4*	ANIMAL AND VEGETABLE OILS AND FATS	2.40	2.52
51	Chemical elements and compounds	8.33	9.12
52	Mineral tar and crude chemicals obtained from coal, petroleum and natural gas	0.08	4.68
53	Dyeing, tanning and colouring materials	6.20	8.79
54	Medicinal and pharmaceutical products	8.62	13.26
55	Essential oils and perfume materials, toilet, polishing and cleaning preparations	12.48	20.22
56	Fertilizers, manufactured	15.87	15.64

Appendix Table A-1-3 (continued)

(M\$ million)

Commodity Section/Division	1975	1977
57 Explosives	1.54	0.94
58 Artificial plastic materials, regenerated cellulose, artificial resins and related materials	6.15	8.15
59 Miscellaneous chemical materials and products	9.23	11.89
5* CHEMICALS AND PRODUCTS OF CHEMICALS INDUSTRIES	68.50	92.69
61 Leather, leather manufactures not elsewhere specified, dressed furs and parts of footwear and saddlery of any material	0.04	0.05
62 Rubber manufactures not elsewhere specified	8.32	11.25
63 Wood or cork manufactures, not elsewhere specified or included	2.01	2.91
64 Paper, paperboard and manufactures thereof	9.25	12.47
65 Textile yarn, fabrics and made-up articles related products, except clothing	21.64	23.50
66 Non-metallic mineral manufactures, not elsewhere specified or included	28.12	28.94
67 Iron and steel and alloys of iron except cerium alloys	47.04	48.02
68 Non-ferrous metals	2.73	3.43
69 Manufactures of metals	22.62	31.67
6* MANUFACTURED GOODS CLASSIFIED CHIEFLY BY MATERIALS	141.77	162.24
71 Machinery other than electric but not excluding machinery driven by electric motors	74.84	176.20
72 Electric machinery, apparatus and appliances	60.77	71.04
73 Transport equipment	41.48	85.39
7* MACHINERY AND TRANSPORT EQUIPMENT	177.09	332.63
81 Sanitary, plumbing, heating and lighting fixtures and fittings and blinds	2.42	2.74
82 Furniture	2.53	2.82
83 Travel goods, handbags and similar articles	1.16	1.80
84 Clothing	12.16	15.84
85 Footwear	7.54	8.67
86 Professional, scientific and controlling instruments, optical and photographic goods, watches and clocks	5.73	8.00
89 Miscellaneous manufactured articles	14.81	20.64
8* MISCELLANEOUS MANUFACTURED ARTICLES	49.95	60.51
91 Postal packages	15.23	14.64
93 Special transactions	9.01	3.48
94 Live animals not commonly used for food	0.02	0.01
95 Weapons except military	0.02	0.02
96 Unissued coins	0.94	1.69
97 Gold	-	0.99
9* TRANSACTIONS AND COMMODITIES NOT ELSEWHERE SPECIFIED	25.22	20.83
** TOTAL OF IMPORT	850.91	1,117.56

Appendix Table A-1-4 Distribution of Population by Age-group, 1970, Sarawak

Age-group	Urban		Rural		Total	
	Number	(%)	Number	(%)	Number	(%)
0 - 4	21,890	(14.5)	141,976	(17.2)	163,866	(16.8)
5 - 9	21,172	(14.0)	143,733	(17.4)	164,905	(16.9)
10 - 14	20,190	(13.3)	101,124	(12.3)	121,314	(12.4)
15 - 19	19,896	(13.2)	79,849	(9.7)	99,745	(10.2)
20 - 24	14,851	(9.8)	61,253	(7.4)	76,104	(7.8)
25 - 29	11,172	(7.4)	52,966	(6.4)	64,138	(6.6)
30 - 34	9,023	(6.0)	44,937	(5.4)	53,960	(5.5)
35 - 39	7,170	(4.7)	41,440	(5.0)	48,610	(5.0)
40 - 44	6,001	(4.0)	36,286	(4.4)	42,287	(4.3)
45 - 49	4,680	(3.1)	30,987	(3.8)	35,667	(3.6)
50 - 54	4,248	(2.8)	29,500	(3.6)	33,748	(3.5)
55 and Over	10,844	(7.2)	61,081	(7.4)	71,925	(7.4)
Total	151,137	(100.0)	825,132	(100.0)	976,265	(100.0)

Appendix Table A-1-5 Labour Force Distribution by Industrial Sector, 1970 Sarawak

	Malay	Melanau	Iban	Land Dayak	Other			Total
					Indigenous	Chinese	Others	
Agriculture, Forestry and Fishery	21.9	26.4	61.0	48.6	55.7	11.2	10.2	34.4
Mining and Quarrying	0.3	0.1	0.03	0.4	0.4	0.2	0.2	0.2
Manufacturing	6.6	10.2	6.1	5.2	3.6	8.7	8.8	7.1
- agricultural products re- quiring substantial processing	3.0	4.2	5.4	4.9	2.8	3.7	6.9	4.2
- others	3.6	6.0	0.7	0.3	0.8	5.0	1.9	2.9
Building and Construction	0.8	0.6	0.2	0.4	0.2	1.9	1.5	0.9
Commerce	2.9	1.9	0.4	0.6	0.7	9.3	6.8	3.8
- transport/storage/communi- cation	1.5	0.5	0.1	0.2	0.2	2.1	2.2	1.0
- others	1.4	1.4	0.3	0.4	0.5	7.2	4.7	2.8
Services	11.9	4.0	2.4	4.6	3.0	8.2	21.9	6.4
- electricity/gas/water/ sanitary services	0.5	0.2	0.1	0.1	0.1	0.2	0.8	0.2
- others	11.4	3.8	2.3	4.5	2.9	8.0	21.1	6.2
Industry not adequately described	3.5	2.5	3.0	7.5	3.8	4.5	4.2	4.0
Total Experienced Labour Force	47.9	45.7	73.1	67.3	67.4	44.0	53.6	56.8
Not working but looking for first job	1.4	1.0	0.8	0.6	0.5	1.7	1.5	1.2
Total Labour Force	49.3	46.7	73.9	67.9	67.9	45.7	55.1	58.0
Not in Labour Force	50.7	53.3	26.1	32.1	32.1	54.3	44.9	42.0
Grand Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Appendix Table A-1-6 Labour Force Distribution by Occupational Sector, 1970 Sarawak

	Malay	Melanau	Iban	Land Dayak	Other			Total
					Indigenous	Chinese	Others	
Professional, Technical & Related Workers	1.5	1.3	0.7	1.2	1.0	2.8	10.8	1.7
Administrative & Managerial Workers	0.2	0.1	0.1	0.03	0.1	0.7	1.1	0.3
Clerical & Related Workers	2.2	0.9	0.4	0.6	0.5	3.4	3.1	1.7
Sales Workers	0.9	0.8	0.2	0.4	0.3	6.0	3.7	2.2
Service Workers	6.3	1.3	1.1	2.4	1.0	3.0	6.8	2.8
Agricultural, Animal Husbandry & Forestry Workers, Fishermen & Hunters	25.0	31.6	66.4	53.2	58.2	14.3	16.5	38.5
Production & Related Workers, Transport Equipment Operators & Labourers	8.3	7.2	1.2	1.9	2.4	9.3	7.4	5.6
Occupation not adequately Described	3.5	2.5	3.0	7.5	3.9	4.5	4.2	4.0
Total Experienced Labour Force	47.9	45.7	73.1	67.2	67.4	44.0	53.6	56.8
Not Working but looking for first job	1.3	1.0	0.8	0.7	0.5	1.7	1.5	1.2
Total Labour Force	49.2	46.7	73.9	67.9	67.9	45.7	55.1	58.0
Not in Labour Force	50.8	53.3	26.1	32.1	32.1	54.3	44.9	42.0
Grand Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Appendix Table A-1-7 Production of Sawlogs, 1976

Timbers	Section				: Tons/CF	
	Kuching	Sibu	Bintulu	Miri	Total	(%)
Belian	330	1,103	4,511	2,258	8,202	(0.3)
Others, Class A	4	106	20	14	144	(0.0)
Ramin	162,170	75,655	51,497	90,694	380,016	(15.5)
Class C	14,456	73,969	89,290	318,996	496,711	(20.2)
Class D	107,801	74,000	131,808	220,740	534,349	(21.7)
Alan	113,924	102,600	16,295	353,371	586,190	(23.9)
Others, Class E	94,757	175,777	107,216	74,256	452,006	(18.4)
Total	493,442	503,210	400,637	1,060,329	2,457,618	(100.0)
(%)	(20.1)	(20.5)	(16.3)	(43.1)	(100.0)	

Appendix Table A-1-8 Sawmill Operation in Sarawak, 1976^{1/}

Section	Number of mills				Average Monthly Labour Employment					Timber Conversion		Recovery Rate
	Vertical Bandmill	Horizon- tal Bandmill	Circular Saw	Total	Chinese	Iban	Malay	Others	Total	Input	Output	%
										(Hoppus Tons)	(Cubic Tons)	
Kuching	3	17	14	34	583	509	602	72	1,766	207,455.77	98,519.47	47.49
Sibu	14	15	5	34	733	336	486	277	1,832	158,693.00	86,058.48	54.23
Bintulu	11 ^{2/}	1	11 ^{3/}	21	81	43	89	6	219	62,466.67	24,621.18	39.41
Miri	13	2	16	31	333	288	259	68	948	112,920.68	46,491.22	41.17
Total	39	35	46	120	1,730	1,176	1,436	423	4,765	541,536.12	255,690.35	47.22

Source: Annual Report of the Forest Department, 1976

^{1/} The input-output statistics of Sarawak Woodchip Co. Sdn. Bhd. (Factory) is not included in the above Table. The input was 228,449.5 metric tons and its output was 159,515.0 metric tons. The recovery rate was 70%.

^{2/} Includes 3 Belian Sawmills

^{3/} Includes 8 Belian Sawmills

Appendix Table A-1-9 Export of Timber by Port of Clearance

Port of Clearance	Tons/CF					
	Sawn Timber		Round Timber		Total	
	1975	1976	1975	1976	1975	1976
Kuching	274	357	34,821	71,860	35,095	72,217
Sibu	6,166	1,268	3,351	20,629	9,517	21,897
Tg. Mani	148,899	191,774	187,840	423,718	336,739	615,492
Bintulu	1,263	1,002	99,871	237,828	101,134	238,830
Miri	10,621	6,392	299,598	800,266	310,219	806,658
Marudi	2,548	2,207	-	-	2,548	2,207
Limbang	344	414	39,784	47,854	40,128	48,268
Lawas	569	72	10,612	15,575	11,181	15,647
Sundar	139	0	21,112	20,862	21,251	20,862
Total	170,823	203,486	696,989	1,638,592	867,812	1,842,078

Appendix Table A-1-10 Exports of Timber

Year	Round Timber						Sawn Timber					
	Ramin	Meranti	Other Non-Conifer Wood	Conifer Wood	Total (000 Tons/CF)	Export Value (M\$ million)	Ramin	Meranti	Other Non-Conifer Wood	Conifer Wood	Total (000 Tons/CF)	Export Value (M\$ million)
1965	62.5	131.6	476.3	4.2	672.6	47.3	170.3	10.3	10.7	0.5	191.8	35.2
1966	100.3	303.6	667.0	0.3	1,071.2	82.5	142.3	3.4	10.9	0.0	156.6	26.3
1967	89.0	480.2	673.2	0.7	1,243.1	99.8	176.3	4.9	13.1	0.0	194.3	36.2
1968	87.5	563.2	1,004.5	0.7	1,655.9	138.7	198.7	4.6	16.3	0.0	219.6	42.4
1969	41.0	743.9	911.2	1.2	1,697.3	143.4	199.6	4.1	11.4	0.1	215.2	43.2
1970	18.4	661.0	1,053.2	0.3	1,732.9	148.4	207.1	4.0	11.0	0.0	222.1	49.8
1971	1.3	573.6	836.9	0.2	1,412.0	120.8	184.0	4.1	11.0	-	199.1	47.1
1972	-	333.3	769.3	4.8	1,107.4	83.5	186.9	5.1	22.7	0.0	214.7	50.9
1973	0.9	242.2	800.4	6.4	1,049.9	123.9	161.7	6.9	13.0	0.0	181.6	87.0
1974	-	197.2	733.9	3.4	934.5	108.2	128.2	5.2	18.0	0.5	151.9	57.7
1975	0.3	210.1	485.9	0.7	697.0	63.7	147.3	3.9	19.4	0.3	170.9	62.2
1976	-	450.6	1,181.7	6.3	1,638.6	242.1	187.8	3.6	11.6	0.5	203.5	117.0

Appendix Table A-2-1 Population Distribution by Race, 1970

Race	Sarawak		4th Div.		5th Div.	
	Number	(%)	Number	(%)	Number	(%)
Malay	182,709	(18.7)	17,371	(12.8)	12,713	(34.6)
Melanau	53,234	(5.5)	7,837	(5.8)	66	(0.2)
Sea Dayak (Iban)	302,984	(31.1)	47,544	(35.0)	4,734	(12.9)
Land Dayak (Bidayuh)	83,276	(8.5)	645	(0.5)	90	(0.2)
Other Indigenous ^{1/}	49,960	(5.1)	27,144	(20.0)	13,747	(37.4)
Chinese	294,020	(30.1)	34,230	(25.1)	5,131	(14.0)
Others	9,735	(1.0)	1,147	(0.8)	250	(0.7)
TOTAL	975,918	(100.0)	135,918	(100.0)	36,731	(100.0)

Source; Sarawak Annual Statistical Bulletin, 1976

^{1/} Including Bisayas, Kedayans, Kayans, Kelabits, Dusun etc.

Race	Niah-Suai-Siputi							
	Miri Sub-dist.		Sub-dist.		Baram Dist.		Limbang Dist.	
	Number	(%)	Number	(%)	Number	(%)	Number	(%)
Malay	9,311	(26.1)	3,334	(15.2)	2,255	(5.7)	5,941	(30.0)
Melanau	1,561	(4.4)	606	(2.7)	135	(0.3)	47	(0.2)
Sea Dayak(Iban)	2,722	(7.6)	10,554	(48.0)	11,940	(30.2)	4,551	(23.0)
Land Dayak(Bidayuh)	264	(0.7)	34	(0.2)	43	(0.1)	55	(0.3)
Other Indigenous	1,039	(2.9)	4,219	(19.2)	19,628 ^{2/}	(49.7)	5,982 ^{1/}	(30.2)
Chinese	20,059	(56.2)	3,178	(14.4)	5,361	(13.6)	3,167	(16.0)
Others	746	(2.1)	61	(0.3)	146	(0.4)	64	(0.3)
TOTAL	35,702	(100.0)	21,986	(100.0)	39,508	(100.0)	19,807	(100.0)

Source; 1970 Census of Population and Housing, Dept. of Statistics

^{1/} Including Bisayas (2,827), Kedayans (2,267), Murut (482) and Kelabit/Tabun (453).

^{2/} Including Kayan (6,936), Kenyah (6,587), Kelabit (2,003), Penan (2,221), etc.

Appendix Table A-2-2 Kampongs with the Population of 500 and more in Baram District, 1977/1978

Name of Kampong	Population		Race ^{1/}
	1977	1978	
Lubok Nibong	n.a.	1,290	Ma/CH
Sg. Selipin	533	600	I/mixed
Lg. Pilah	702	702	KN
Lg. Miri	539	539	KN
Lg. Laput	713	713	KN
Lg. Bemang	944	1,044	KN
Lg. Terawan	614	614	Ky
Lg. Atip	624	624	KN
Lg. Bedian	578	578	Ky
Lg. Jee	587	587	Ky
Lg. Moh	651	651	Ky

^{1/} Ma; Malay, CH; Chinese, KN; Kenyah, Ky; Kayan, I; Iban

Appendix Table A-2-3 Estimated Future Population by Division

Division	Population				Annual Growth Rate (%)		
	1977	1985	1995	2005	77-85	85-95	95-95
First Div.	430,670 (37.1)	548,376 (38.9)	732,314 (41.1)	967,359 (43.3)	3.07	2.94	2.82
Second Div.	157,758 (13.6)	183,955 (13.1)	220,002 (12.4)	260,253 (11.7)	1.94	1.81	1.70
Third Sixth Seventh Div.	359,713 (31.0)	410,460 (29.1)	478,036 (26.8)	550,685 (24.6)	1.67	1.54	1.43
Fourth Div.	169,276 (14.6)	216,377 (15.4)	290,362 (16.3)	385,422 (17.2)	3.12	2.99	2.87
Fifth Div.	42,507 (3.7)	49,955 (3.5)	60,333 (3.4)	72,074 (3.2)	2.04	1.91	1.80
Total	1,159,924 (100.0)	1,409,123 (100.0)	1,781,047 (100.0)	2,235,793 (100.0)	2.47	2.37	2.30

Appendix Table A-2-4 Exports of Agricultural Products by Port in the Study Area

Commodity	Tons					
	Miri		Marudi		Limbang	
	1976	1977	1976	1977	1976	1977
Rubber	664	1,023	718	531	552	659
White Pepper	999	1,122	102	53	3	5
Black Pepper	112	214	54	61	11	53
Sago Flour	2	2	-	-	-	-
Coconut Oils	1,042	767	18	1	-	-
Total	2,819	3,128	892	646	566	717

Appendix Table A-2-5 Description of Agricultural Potential Area

Block	1. LINEI PUTEH	2. KWALA TIRAJAR
Area (Acres)	5,400. The area could possibly be extended east into the Buang River system. Acreage under primary forest: 4,300. Acreage under title: nil.	9,700. The area could be extended down the Baram River slightly. Acreage under primary forest: 5,000. Some is possibly old secondary forest. Acreage under title: 215.
Dominant Topography	Low to moderately high and steep ridges and hills of Terrain Classes 6 and 6. Slope facets of Terrain Class 8 are common and small areas of Terrain Class 1 probably occur in places.	Flat to gently sloping alluvial basins of Terrain Class 1.
Main Soils	The Nyalau Family of soils is dominant in hill areas, with subordinate Merit Family soils in places. River levees contain Semilajau soils and river basins Malang soils.	The Bijat Family of soils is dominant except on the levees of main rivers and ox-bow lakes where Malang soils occur. Patches of Anderson Family peat, both at the surface and beneath the clay soils may be present in the Tasong area.
Present Cultivation	Mainly hill rice, some swamp rice and seedling rubber close to rivers.	Mainly swamp and hill rice; scattered fruit and vegetable gardens near villages; small patches of seedling rubber close to rivers.
Main Hazards	Low soil fertility and strong risk of gully erosion with Nyalau soils on slopes exceeding 15-20, areas which should be avoided where possible.	Periodic flooding and the presence of deep peat.
Land Suitability	Many small hill areas are too steep for agriculture, large areas are marginal; alluvial valleys and low hills are the most suitable for agriculture. A post-detailed soil survey would be necessary to delimit the small areas of steep land with shallow soils.	Most is suitable for the cultivation of mainly irrigated crops; the patches of deep peat, are unsuitable for cultivation and are probably most common in the Tasong area. A thorough appreciation of the flooding, drainage and irrigation problems is required before development.

Block	3. KWALA TUTUH	4. KWALA PEKING	5. IPANG
Area (Acres)	6,300. The area could be extended considerably up the Tutuh River. Acreage under primary forest: 300. Some is possibly old secondary forest. Acreage under title: 279.	5,700. There is little scope for extension. Acreage under primary forest: 2,000. Small areas are possibly old secondary forest. Acreage under title: nil.	7,500. The area could be extended up the Baram River considerably. Acreage under primary forest: 200. Small areas are possibly old secondary forest. Acreage under title: nil.
Dominant Topography	Flat to gently sloping alluvial land of Terrain Class 1.	Flat to gently sloping alluvial land of Terrain Class 1.	Flat to undulating alluvial land of Terrain Class 1.
Main Soils	Bijat and Malang Family soils are dominant with possibly small patches of surface peat, and sandy levee soils of the Semilajau Family.	Bijat Family soils are dominant with the possibility of shallow surface peat and deep peat beneath shallow clay south of the Peking River.	Bijat and Malang Family soils are dominant, the latter on river banks and close to streams. Patches of Anderson Family peat soils may occur, particularly close to swamp margins.
Present Cultivation	Mainly swamp and hill rice; scattered fruit and vegetable gardens near villages; a few small seedling rubber gardens close to rivers.	Mainly swamp rice and small scattered seedling rubber gardens close to rivers.	Mainly swamp rice with vegetable, fruit and rubber gardens adjacent to rivers.
Main Hazards	Periodic flooding.	Periodic flooding.	Periodic flooding.
Land Suitability	Most is suitable for cultivation, partly of irrigated crops, partly for dry land crops. A thorough appreciation of the flooding, drainage and irrigation problems is required before development.	Most land is suitable for the cultivation of irrigated crops. Areas south of the Peking River may be marginal or unsuitable due to the presence of peat. A thorough appreciation of the flooding, drainage and irrigation problems is required before development.	Most land is suitable of cultivation, partly of irrigated crops, partly of dry land crops. There are possibly patches of peat unsuitable for cultivation. A thorough appreciation of the flooding, drainage and irrigation problems is required before development.

Block	6. TERU	7. PEKING	8. BAIN-LAMA
Area (Acres)	3,000. The area could be extended west considerably into the upper Barap River. Acreage under primary forest: 400. Some is possibly old secondary forest. Acreage under title: nil.	10,000. There is a little scope for extension of the block onto low hills on all margins. Acreage under primary forest: 5,000. Acreage under title: nil.	21,700. The area could be extended onto rather high hill land mainly in the south. Acreage under primary forest: 11,500. Acreage under title: nil.
Dominant Topography	Flat to gently sloping alluvial land of Terrain Class 1.	Low to moderately high, gentle to steeply sloping hills. Small slope facets of Terrain Class 8 are probably common.	Low to moderately high hills and ridges with gentle to steep slopes of Terrain Classes 4 and 6. Many small slope facets occur of Terrain Class 8.
Main Soils	Bijat soils are dominant with subordinate Mukoh, and probably Anderson family peat, in places.	Merit Family soils are dominant with subordinate Malang, Bijat and Anderson soils in small valleys.	Merit Family clayey soils are dominant, with locally Nyalau soils and Merit soils with sandy upper subsoils. Small valleys contain Malang and Bijat family soils with a few patches of Anderson Family peat.
Present Cultivation	Mainly swamp rice and a few seedling rubber gardens close to rivers.	Mainly hill rice, and seedling rubber gardens close to villages.	Largely hill rice with a few small seedling rubber gardens close to villages.
Main Hazards	Periodic flooding and the presence of deep peat close to swamp margins.	Low to moderately high, gently to steeply sloping hills. Small slope facets of Terrain Class 8 are probably common.	Low soil fertility and sheet and gully erosion on unprotected steep slopes. Shallow soils in places.
Land Suitability	Much land is suitable for the cultivation of irrigate crops mainly; patches of unsuitable deep peat may be present. A thorough appreciation of the flooding, drainage and irrigation problems is required before development.	Most of this block is thought to be suitable, or in places marginal, for the cultivation of dry land, annual or perennial crops.	Most of this block is thought to be suitable for the cultivation of dry land, annual and perennial crops, although many small patches may be marginal or unsuitable due to steep slopes and shallow soils.

Appendix Table A-2-5 Description of Agricultural Potential Area (Cont'd)

Block	9. SELENEN-AROH	10. MALOI-TABIR
Area (Acres)	8,600. There is little extra hill land available but much alluvial land adjacent to the Baram River. Acreage under primary forest: 2,400. Acreage under title: nil.	7,500. The area could be extended slightly on to higher hill land mainly to the south. Acreage under primary forest: 6,800. Acreage under title: nil.
Dominant Topography	Low to moderately high, gentle to steep hills and ridges of Terrain Class 4 and 6. Many small slope facets of Terrain Class 8 occur.	Low to moderately high, gentle to steep hills and ridges of Terrain Classes 4 and 6. Many small slope facets of Terrain Class 8 occur and patches of Terrain Class 7 may be common.
Main Soils	Merit Family soils are dominant with subordinate Nyalau soils mainly on the crests of high ridges. Malany and Bijat soils have been noted in small valleys.	Merit Family soils are probably dominant with Nyalau soils being confined largely to the higher ridges. Valleys contain both Semitajau and Malany soils and on the northern margin Anderson Family peat occupies some valleys.
Present Cultivation	Mainly hill rice with seedling rubber gardens close to villages.	Mainly hill rice and rubber. In the Tabir (Bawang) area R.F.S. 'A' rubber has been planted successfully.
Main Hazards	Low soil fertility and sheet and gully erosion in unprotected steep slopes. Shallow soils in places.	Low soil fertility and sheet and gully erosion on steep slopes. Shallow soils in places.
Land Suitability	Most of the block is thought to be suitable for the cultivation of dry land, annual and perennial crops, although many small patches may be marginal or unsuitable due to steep slopes and shallow soils.	Much of the block is thought to be suitable or marginal for the cultivation of dry land, perennial and annual crops; small areas are likely to be unsuitable due to steep slopes and shallow soils. A semi-detailed survey may be necessary to delimit the worst areas.

Block	11. TERAWAN-WEST	12. TERAWAN-EAST
Area (Acres)	3,300. There is a little scope for extension on the northern margins onto hill land, possibly containing poor terrace soils and alluvial land. Acreage under primary forest: 2,900. Timber is being extracted in the north. Acreage under title: nil.	2,500. It may be possible to extend the area eastwards onto higher hills and westwards onto alluvial land. Acreage under primary forest: 2,400. Acreage under title: nil.
Dominant Topography	Moderately high to high, moderately steep to steep ridges of Terrain Class 6 occur to the north. Dissected, rather lower hills of Terrain Classes 4 and 6 occupy the southern parts. Slope facets of Terrain Class 8 are probably most common in the ridges to the north.	Low to moderately high hills and ridges with gentle to steep slopes of Terrain Classes 4 and 6. Slope facets of Terrain Class 8 may be common.
Main Soils	Mixed Merit and Nyalau family soils occur and possibly gravelly Sebaganig soils in the north. The Nyalau members are confined mainly to high ridges. Minor patches of deep peat occur in marginal valleys.	Mixed Merit-Nyalau family soils are dominant with long narrow belts of Malany and Semitajau soils in few valleys.
Present Cultivation	Mainly hill rice in the north.	A small patch of land is cultivated for hill rice in the north.
Main Hazards	Low soil fertility, sheet and gully erosion on higher steep hills and ridges and shallow soils.	Low soil fertility, sheet and gully erosion on high steep hills and shallow soils.
Land Suitability	Much of the land is marginal to suitable for the cultivation of dry land, perennial and annual crops. There are probably many small areas of unsuitable land on steep slopes. A semi-detailed soil survey may be necessary to delimit the worst areas.	Much of the land is marginal or suitable for the cultivation of dry land annual and perennial crops. A semi-detailed soil survey may be necessary to delimit the worst areas.

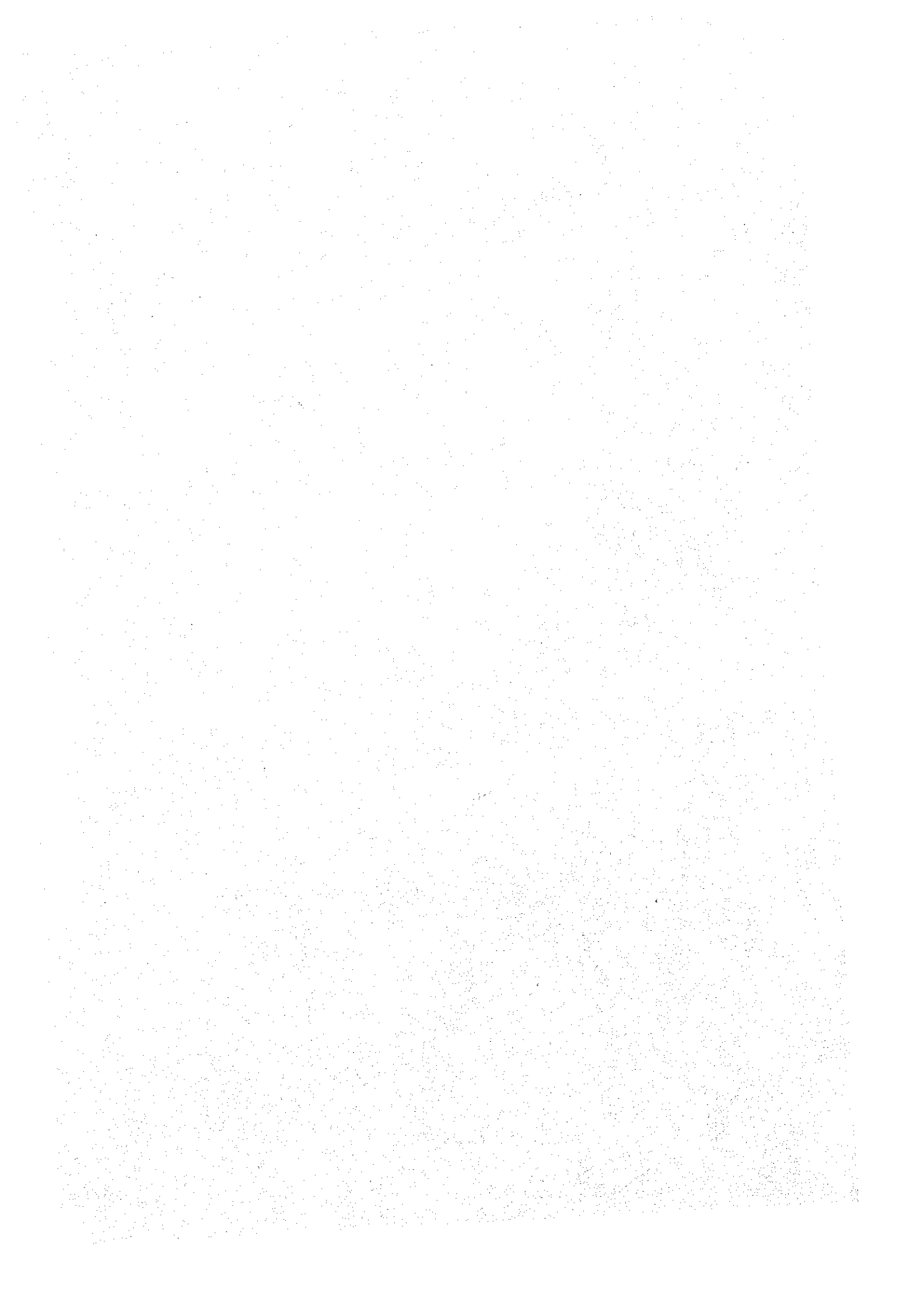
Block	13. GAK	14. BEREI SELAMAT-WEST	15. BEREI SELAMAT-EAST
Area (Acres)	3,600. It may be possible to extend the area north and south into higher hills. Acreage under primary forest: 3,400. Part of the area is being exploited for timber. Acreage under title: nil.	7,200. There is little scope for expansion of this area. Acreage under primary forest: 6,100. Acreage under title: nil.	3,500. There is little scope for extending this block. Acreage under primary forest: nil. Acreage under title: nil.
Dominant Topography	Low to moderately high hills and ridges with gentle to steep slopes of Terrain Classes 4 and 6. There are probably many slope facets of Terrain Class 8 and small areas of Terrain Class 7.	Low to moderately high hills and ridges with gentle to steep slopes in Terrain Classes 4 and 6. Many slope facets of Terrain Class 3 occur and there may be some hills of Terrain Class 7.	Low to moderately high, gentle to steep hills and ridges of Terrain Classes 4 and 6. Many slope facets of Terrain Class 3 occur.
Main Soils	Mixed Merit and Nyalau family soils with Bijat and Malany soils in the valleys.	Merit family soils are dominant. Small valleys on margins contain Anderson Family peat.	Merit Family soils are thought to occur throughout the area with subordinate Espit soils on steep slopes.
Present Cultivation	nil.	Part of the area is planted with hill rice in the west.	nil.
Main Hazards	Low soil fertility, sheet and gully erosion on steep slopes and shallow soils.	Low soil fertility, sheet erosion on unprotected steep slopes and shallow soils.	Low soil fertility, erosion on unprotected steep slopes and shallow soils.
Land Suitability	Much of the land is marginal or suitable for the cultivation of dry land, perennial and annual crops. Many small areas consist of slopes too steep for cultivation. A semi-detailed soil survey may be required for the delimitation of the worst areas.	Most of this block is considered to be suitable for agriculture although many small areas of marginal and unsuitable land occurs, mainly on steep slopes.	Most of the land is marginal to suitable of the cultivation of dry land, perennial and annual crops. Further field investigations may prove that the steep land is extensive.

Appendix Table A-2-5. Description of Agricultural Potential Area (Cont'd)

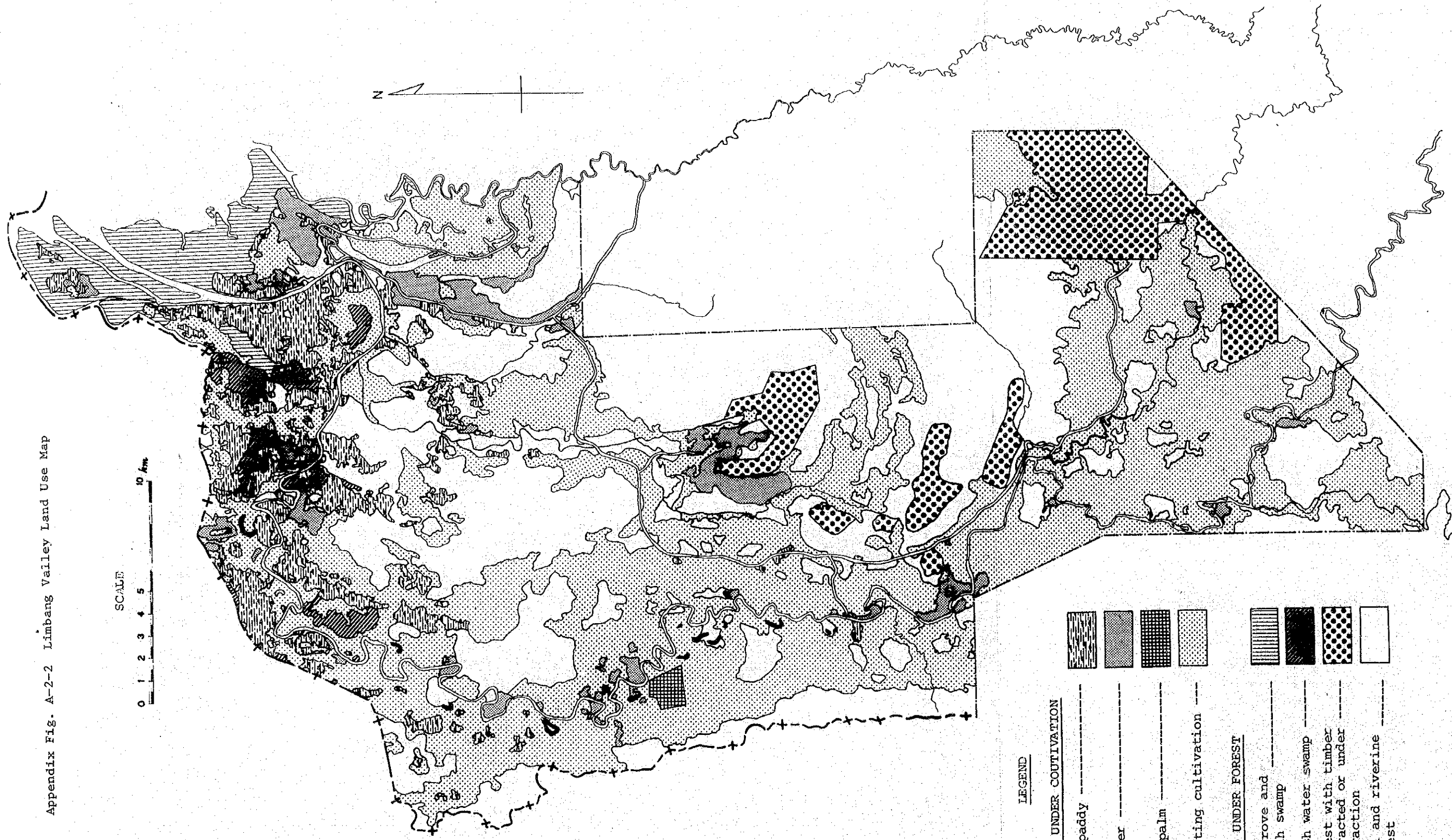
Block	16. ULU TERAPAN	17. ULAT-NORTH	18. ULAT-SOUTH
Area (Acres)	2,200. Extensions to this block might be made to the north on alluvial and/or peat land. Acreage under primary forest: nil. Acreage under title: nil.	1,200. It may be possible to extend this area north to higher hill land. Acreage under primary forest: nil. Acreage under title: nil.	2,000. It may be possible to extend this block north among higher hill land. Acreage under primary forest: 200. Acreage under title: nil.
Dominant Topography	Flat alluvial land.	Low to moderately high, gentle to steep hills and ridges of Terrain Classes 4 and 5. Many slope facets of Terrain Class 8 occur.	Low to moderately high hills and ridges with gentle to steep slopes in Terrain Classes 4 and 5. Many slope facets of Terrain Class 8 occur and there may be some hills of Terrain Class 7.
Main Soils	It is thought that Bijat and Malang family soils are dominant but it is possible that many parts contain deep surface peat or peat beneath shallow clay.	Merit Family soils are thought to be dominant probably with Malang and Bijat soils in the small valleys.	Merit Family soils are dominant. Small valleys on the margins contain Anderson Family peat.
Present Cultivation		nil.	nil.
Main Hazards	Periodic flooding and presence of deep peat.	Low soil fertility, sheet erosion on unprotected steep slopes and shallow soils.	Low soil fertility, sheet erosion on unprotected steep slopes and shallow soils.
Land Suitability	Land suitable for the cultivation of irrigated crops is probably dominant, although the possible presence of much peat unsuitable for cultivation must not be discounted. A semi-detailed survey would be required to delimit the unsuitable land, and a thorough appreciation of the flooding, drainage and irrigation problems is required before any development takes place.	Most of the land is marginal to suitable for the cultivation of dry land, perennial and annual crops. Further field investigations may prove that the steep land is extensive.	Most of this block is considered to be suitable for agriculture although many small areas of marginal and unsuitable land occur, mainly on steep slopes.

Block	19. BEMAND	20. LAHAL
Area (Acres)	3,600. It may be possible to extend this block southwards among higher hill land. Acreage under primary forest: nil. Acreage under title: nil.	4,000. This block could probably be extended to the east and south among higher hill land if necessary. Acreage under primary forest: nil (?). Acreage under title: nil.
Dominant Topography	Low to moderately high, gentle to steep hills and ridges of Terrain Classes 4 and 5. Many small slope facets of Terrain Class 8 occur and patches of Terrain Class 7 may be present.	Low to moderately high, gentle to steep hills and ridges of Terrain Classes 4 and 5. Many small slope facets of Terrain Class 8 occur and patches of Terrain Class 7 may be present.
Main Soils	Merit Family soils are thought to be dominant with Anderson Family peat and Malang and Bijat soils in the valley on the margins.	Merit Family soils are dominant with subordinate Nyalaau soils in a few places on the higher ridges.
Present Cultivation	Small areas in the north are in use for hill rice cultivation.	It is probable that small parts are used for hill rice cultivation (none in 1951 air photographs).
Main Hazards	Low soil fertility and sheet and gully erosion on steep slopes. Shallow soils in places.	Low soil fertility and sheet and gully erosion on steep slopes. Shallow soils in places.
Land Suitability	Much of the block is thought to be suitable or marginal for the cultivation of dry land, perennial and annual crops; small areas are likely to be unsuitable due to steep slopes and shallow soils. A semi-detailed survey may be necessary to delimit the worst areas.	Much of the block is thought to be suitable or marginal for the cultivation of dry land, perennial and annual crops; small areas are likely to be unsuitable due to steep slopes and shallow soils. A semi-detailed survey may be necessary to delimit the worst areas.

Block	21. NYALIN	22. ATIP	23. MELANA
Area (Acres)	14,500. Extensions to this block could probably be made to the south and possibly to the west among higher hills. Acreage under primary forest: 7,300. Acreage under title: nil.	1,400. Extensions to this block can only be made into alluvial land on the margins. Acreage under primary forest: 100. Acreage under title: nil.	2,500. Slight extensions to this block can be made to the east. Acreage under primary forest: 200. Acreage under title: nil.
Dominant Topography	Low to moderately high, gentle to steep hills and ridges of Terrain Classes 4 and 5. Many small slope facets of Terrain Class 8 occur and patches of Terrain Class 7 may be present.	Low to moderately high, gentle to moderately steep hills of Terrain Class 4. Slope facets of Terrain Class 8 are few.	Low to moderately high hills and ridges with gentle to steep slopes in Terrain Classes 4 and 5. Many slope facets of Terrain Class 8 occur and there may be some hills of Terrain Class 7.
Main Soils	Merit Family soils are dominant, and Nyalaau Family soils are thought to occur also in the west, mainly in higher hills. Small valleys contain Malang and Bijat soils mainly.	Merit soils are dominant with subordinate Bijat and Mukah soils in the common minor valleys.	Merit Family soils are dominant, in places Kapit Family soils occur.
Present Cultivation	Parts in the east are used for hill rice cultivation. Small fruit, coffee and rubber gardens, some R.P.S.'A', are located near rivers.	Almost wholly hilly rice.	Mainly hill rice cultivation, with fruit, coffee and seedling rubber gardens close to rivers.
Main Hazards	Low soil fertility and sheet and gully erosion on steep slopes. Shallow soils in places.	Soil fertility, sheet erosion on unprotected steep slopes and shallow soils.	Low soil fertility, sheet erosion on unprotected steep slopes and shallow soils.
Land Suitability	Much of the block is thought to be suitable or marginal for the cultivation of dry land, perennial and annual crops; small areas are likely to be unsuitable due to steep slopes and shallow soils. A semi-detailed survey would be necessary to delimit the worst areas.	Most of this block is considered to be suitable for cultivation of dry land, perennial and annual crops. Small patches of marginal land may occur where there are steep slopes.	Much of this block is considered to be marginal to suitable for cultivation. Many small areas may be unsuitable due to steep slopes. A semi-detailed soil survey would be required to delimit the worst areas.



Appendix Fig. A-2-2 Limbang Valley Land Use Map



SCALE
0 1 2 3 4 5
10 Km

LEGEND

LAND UNDER CULTIVATION

- Wet paddy -----
- Rubber -----
- Oil palm -----
- Shifting cultivation -----

LAND UNDER FOREST

- Mangrove and Nipah swamp -----
- Fresh water swamp -----
- Forest with timber extracted or under extraction -----
- Hill and riverine Forest -----

Appendix Table A-2-6 Hill Timber Production, 1977

Species	Fourth Div.			Fifth Div.			000HT
	Export	Sawmill	Total	Export	Sawmill	Total	
Meranti	366.9	1.9	368.8	61.0	1.8	62.8	
Ranggu	4.9	neg.	4.9	neg.	-	neg.	
Kapor	83.8	1.2	85.0	11.8	0.8	12.6	
Keruing	44.9	1.5	46.4	7.9	0.4	8.3	
S. Batu	35.5	1.2	36.7	1.0	0.6	1.6	
Resak	0.5	0.1	0.6	neg.	-	neg.	
Sepetir	8.4	0.1	8.5	neg.	-	neg.	
Medang	1.4	0.1	1.5	neg.	-	neg.	
Bindang	0.1	-	0.1	10.4	-	10.4	
Kerukup	neg.	-	neg.	neg.	-	neg.	
Others	76.3	1.1	77.4	2.0	neg.	2.0	
Total	622.7	7.2	629.9	94.1	3.6	97.7	

Source; Forest Department Annual Report, 1977, Miri Section

Appendix Table A-2-7 Swamp Timber Production

Species	Fourth Div.			Fifth Div.			000HT
	Export	Sawmill	Total	Export	Sawmill	Total	
Ramin	-	60.2	60.2	-	4.9	4.9	
Jongkong	1.3	neg.	1.3	2.6	neg.	2.6	
Sepetir	29.6	0.8	30.4	0.2	neg.	0.2	
Medang	0.5	neg.	0.5	neg.	neg.	neg.	
Semayur	0.4	neg.	0.4	-	-	-	
Kerukup	4.0	1.5	5.5	neg.	-	neg.	
Alan	312.8	38.2	351.0	-	-	-	
Meranti	2.8	0.1	2.9	0.5	-	0.5	
Kapor	7.1	0.7	7.8	0.2	-	0.2	
Others	26.4	1.1	27.5	0.7	0.1	0.8	
Total	384.9	102.6	487.5	4.2	5.0	9.2	

Source; Forest Department Annual Report: 1977, Miri Section

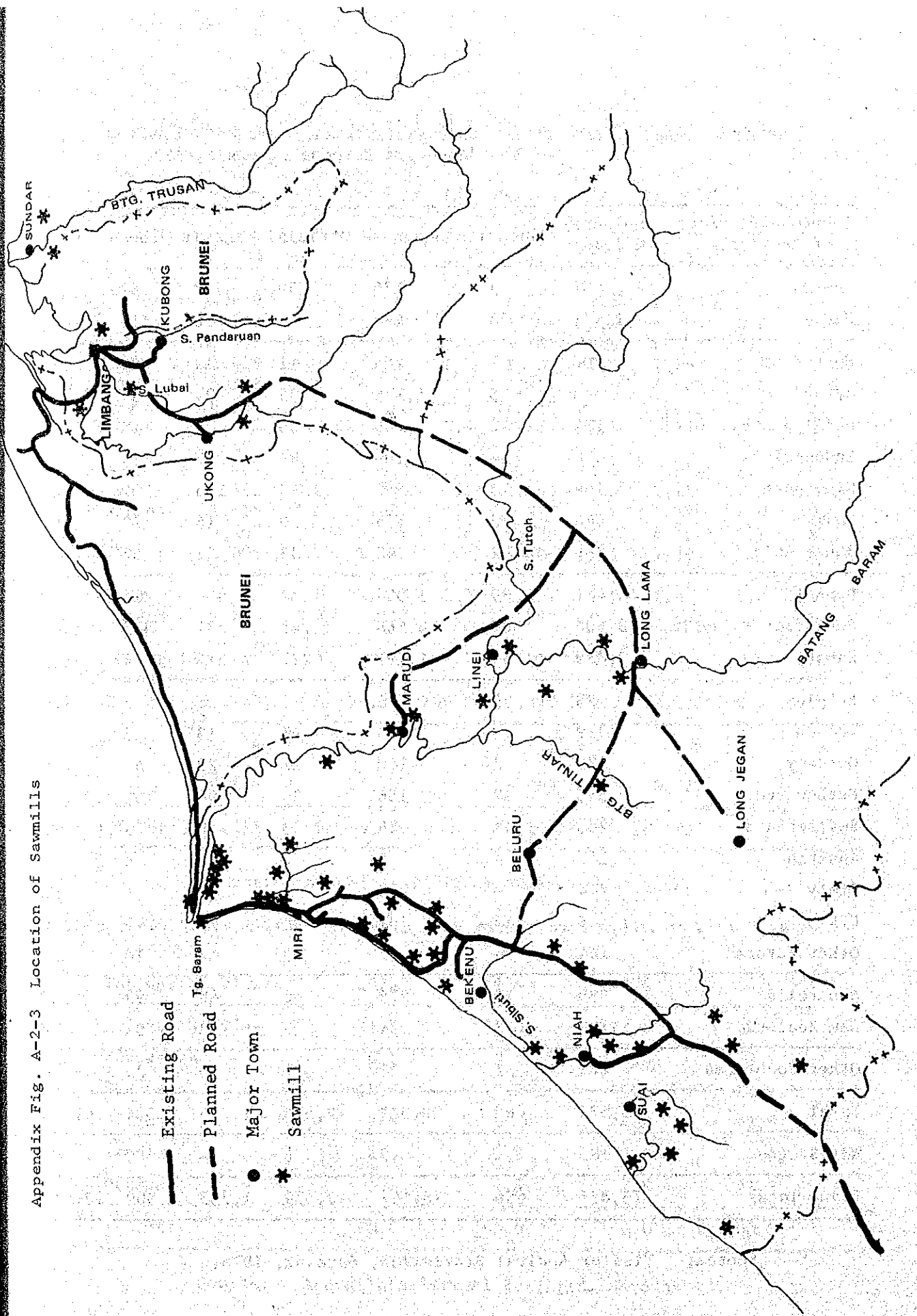
Appendix Table A-2-8 Sawmill Operation in Miri Section

Section	Number of Sawmills		Total No. Sawmills	Average Labour Employed			Sawn Timber Conversion		Remarks	
	Vertical Band	Horizontal Band		Chinese	Iban	Malay	Others	In-put (hop. ton)		Out-put (Cu. ton)
Miri	14	4	21	268	292	252	18	38	868	*Including 3 domestic and belian mills, and 4 new licences issued during the year.
Section			39*	(25)	(23)	(6)	-	(1)	(55)	
TOTAL:				293	315	258	18	39	913	

NOTE: Figures in brackets denotes the No. of female employees.

Source: Forest Department Annual Report 1977, Miri Section

Appendix Fig. A-2-3 Location of Sawmills



Appendix Table A-2-9 Arrivals of Visitors by Permanent Place of Residence and Purpose of Visit, 1976

Permanent Place of Residence	Leisure/ Holiday	Education	Business	Official	Transit	Others	Total
Canada	487	3	135	39	32	82	778
U.S.A.	1,971	28	499	45	56*	115	2,714
Hong Kong	406	1	245	11	13	26	702
Japan	733	5	1,136	35	24	36	1,969
Philippines	114	2	66	36	23	15	256
Indonesia	698	14	109	57	247	118	1,243
Singapore	5,169	13	4,558	45	145	107	10,037
India	646	2	125	20	16	29	838
Other Asia	266	2	183	38	31	62	582
Brunei	46,441	89	1,954	38	436	274	49,232
Peninsular Malaysia	8,606	305	6,668	1,748	234	859	18,420
Sabah	3,889	164	1,191	227	215	144	5,830
Belgium	125	1	24	1	1	6	158
France	769	3	75	7	13	23	890
Germany	983	2	140	17	23	47	1,212
Netherlands	585	2	156	34	98	166	1,041
Switzerland	265	1	25	3	3	13	310
Austria	147	-	8	2	1	-	158
Italy	244	-	28	5	2	1	280
U.K.	1,546	13	791	92	75	218	2,735
Other Europe	144	-	77	3	12	10	246
Australia	939	10	279	62	48	93	1,431
New Zealand	222	3	34	3	2	36	300
Other Countries	277	2	33	7	5	24	348
Total	75,672	665	18,539	2,575	1,755	2,504	101,710
Not Stated	185	1	8	4	-	5	203
Grand Total	75,857	666	18,547	2,579	1,755	2,509	101,913

Source; Visitor Arrival Statistics, Sarawak, 1976.

Appendix Table A-2-10 Arrivals of Visitors by Nationality, Sarawak

Nationality	1972		1973		1975		1976		Annual Growth Rate(%)
	Persons	(%)	Persons	(%)	Persons	(%)	Persons	(%)	
U.S.A.	2,304	3.8	2,518	3.8	2,889	3.7	3,463	3.7	10.0
Canada	400	0.7	502	0.7	515	0.7	901	1.0	17.9
Japan	1,638	2.7	1,790	2.7	1,973	2.5	1,958	2.1	4.6
India	1,322	2.2	949	1.4	899	1.2	1,090	1.2	-4.3
Brunei	20,559	34.0	22,492	33.9	26,130	33.4	36,778	39.5	14.0
Indonesia	1,019	1.7	1,595	2.4	1,563	2.0	1,169	1.3	2.6
Singapore	6,338	10.5	6,240	9.4	7,814	10.0	8,573	9.2	8.6
Malaysia	16,918	28.0	19,517	29.4	21,664	27.7	24,498	26.3	8.8
Other Asia	1,421	2.3	1,260	1.9	1,184	1.5	1,430	1.5	-0.5
France	487	0.8	662	1.0	972	1.2	974	1.0	19.4
Germany	492	0.8	726	1.1	2,435	3.1	1,416	1.5	39.4
Netherlands	1,515	2.5	1,627	2.5	1,995	2.6	2,225	2.4	10.2
U.K.	3,547	5.9	3,641	5.5	4,428	5.7	4,794	5.1	8.3
Other Europe	1,009	1.7	1,145	1.7	1,406	1.8	1,393	1.5	8.9
Australia	986	1.6	1,156	1.7	1,552	2.0	1,698	1.8	14.8
New Zealand	242	0.4	317	0.5	320	0.4	365	0.4	8.7
Other Countries	246	0.4	250	0.4	410	0.5	434	0.5	17.7
Total	60,443	100.0	66,387	100.0	78,149	100.0	93,159	100.0	10.8
Not Stated	14		2		42		77		-
Stateless Persons	10,684		12,997		8,009		8,677		-
Grand Total	71,141		79,386		86,200		101,913		8.3

Source; Annual Statistical Bulletin, Sarawak

Appendix Table A-2-11 Arrivals of Visitors by Purpose of Visit, Sarawak

Purpose of Visit	1973	1974	1975	1976 (%)
Leisure/Holiday	71.7	71.3	71.0	74.4
Education	0.1	0.5	0.6	0.7
Business	18.3	19.2	20.3	18.2
Official	2.8	2.7	4.0	2.5
Transit	2.0	1.9	2.2	1.7
Others	5.1	4.4	1.9	2.5
Total	100.0	100.0	100.0	100.0

Source; Annual Statistical Bulletin, Sarawak

Appendix Table A-2-12 Arrivals of Visitors by Mode of Transport, Point of Entry and Purpose of Visit, 1976

Mode of Transport	Point of Entry	Purpose of Visit					Total	
		Leisure/ Holiday	Education	Business	Official	Transit		Others
AIR	Kuching	14,144	464	10,253	1,767	720	1,230	28,578
	Miri	3,224	56	4,162	439	209	368	8,458
	Others	128	2	100	7	12	33	282
	Sub-total	17,496	522	14,515	2,213	941	1,631	37,318
SEA	Kuching	473	5	40	199	65	128	910
	Limbang	19,502	5	802	31	214	60	20,614
	Lawas	790	7	100	4	4	33	938
	Sundar	1,395	1	26	3	112	10	1,547
	Others	101	-	-	22	249	17	408
Sub-total	22,261	18	987	259	644	248	24,417	
LAND	Sungei Tujoh	37,754	122	3,032	107	153	599	39,767
	Biawak	174	-	-	-	6	20	200
	Others	172	4	13	-	11	11	211
Sub-total	36,100	126	3,045	107	170	630	40,178	
TOTAL		75,857	666	18,547	2,579	1,755	2,509	101,913

Source; Annual Statistical Bulletin, Sarawak, 1976.

Appendix Table A-2-13 Arrivals of Visitors by Mode of Transport, Sarawak

Mode of Transport	1972	1973	1975	1976	Average Annual Growth Rate (%)
Air ; Number	24,704	29,460	35,527	37,318	10.7
(%)	(34.7)	(37.1)	(41.2)	(36.6)	
Sea ; Number	17,358	18,708	18,442	24,417	6.9
(%)	(24.4)	(23.6)	(21.4)	(24.0)	
Land ; Number	29,079	31,218	32,231	40,178	7.0
(%)	(40.9)	(39.3)	(37.4)	(39.4)	
Total ; Number	71,141	79,386	86,200	101,913	8.3
(%)	(100.0)	(100.0)	(100.0)	(100.0)	

Source; Annual Statistical Bulletin, Sarawak, 1973 and 1976.

Appendix Table A-2-14 Arrivals of Visitors by Intended Length of Stay, 1976

Intended Length of Stay	AIR		SEA		LAND		TOTAL	
	Persons	(%)	Persons	(%)	Persons	(%)	Persons	(%)
Less than 1 day	507	(1.4)	12,856	(53.2)	2,659	(6.6)	16,022	(15.9)
1 - 3 days	8,568	(23.3)	4,771	(19.7)	18,323	(45.8)	31,662	(31.4)
4 - 7 days	11,539	(31.4)	3,547	(14.7)	13,900	(34.7)	28,986	(28.7)
8 - 14 days	10,069	(27.4)	2,456	(10.2)	3,779	(9.4)	16,304	(16.2)
15 - 21 days	1,121	(3.1)	70	(0.3)	251	(0.6)	1,442	(1.4)
22 days to 1 month	587	(1.6)	54	(0.2)	84	(0.2)	725	(0.7)
1 - 3 months	2,406	(6.6)	150	(0.6)	517	(1.3)	3,073	(3.0)
3 - 6 months	660	(1.8)	41	(0.2)	156	(0.4)	857	(0.8)
6 months to 1 year	366	(1.0)	30	(0.1)	178	(0.5)	574	(0.6)
Over 1 year	899	(2.4)	186	(0.8)	210	(0.5)	1,295	(1.3)
Total	36,722	(100.0)	24,161		40,057		100,940	
Not Stated	596		256		121		973	








Source; Annual Statistical Bulletin, Sarawak.

Appendix Table A-2-15 Monthly Variation of Arrivals of Visitors, Sarawak

Month	1973	1974	1975	1976
January	6.7	7.1	7.2	6.1
February	7.2	6.8	7.0	7.1
March	6.5	8.0	8.5	7.3
April	9.6	9.3	9.6	8.8
May	8.6	8.0	8.5	9.0
June	8.2	7.9	7.0	7.9
July	9.5	8.6	8.5	8.4
August	10.5	10.2	10.1	8.7
September	7.7	7.9	7.5	9.8
October	8.8	8.7	8.8	7.8
November	7.6	7.2	7.7	8.3
December	9.1	10.3	9.6	10.8
TOTAL	100.0	100.0	100.0	100.0

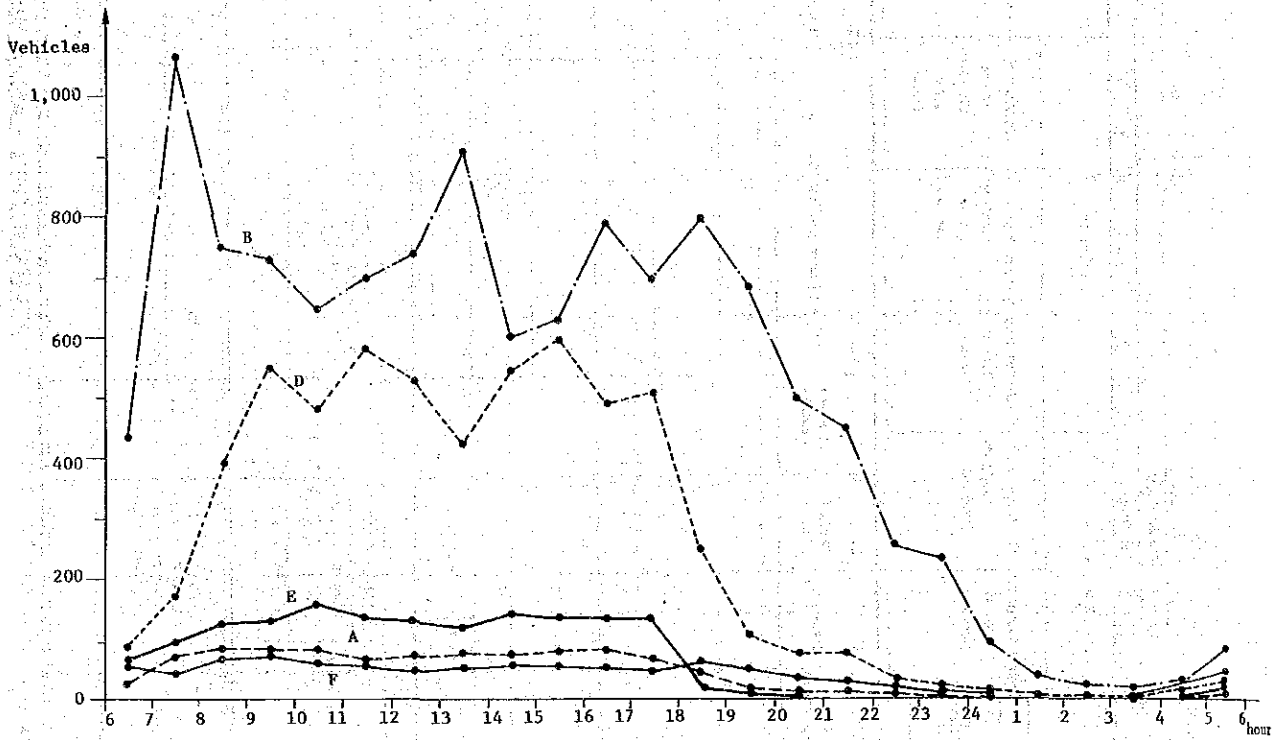
Source; Annual Statistical Bulletin, Sarawak, 1973 and 1976.

Appendix Fig. A-3-1 Traffic Count Survey Sheet

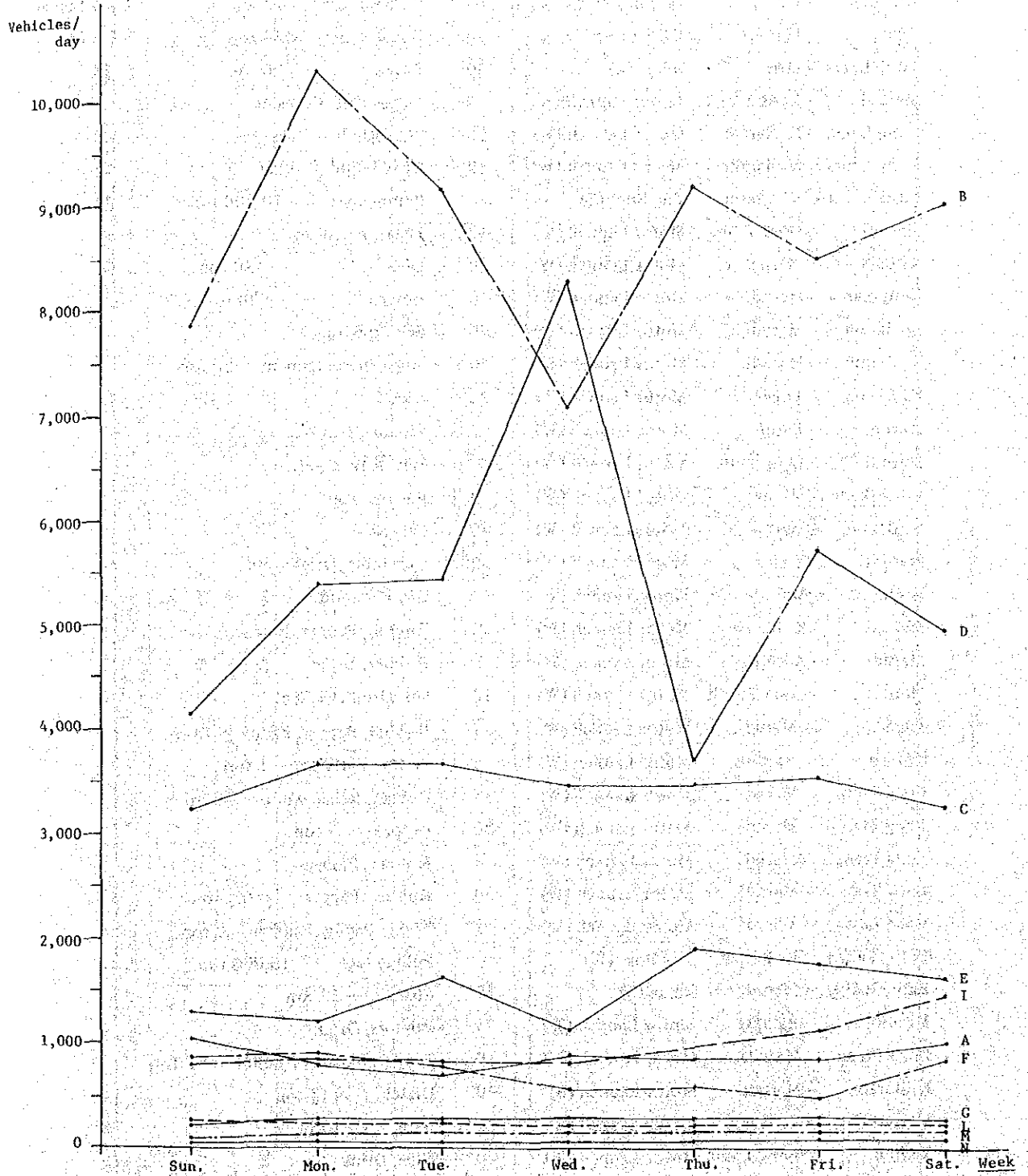
Station No.	Date of Count	Weather	Direction																Name of Supervisor	Sheet No.					
			0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15			16	17	18	19	20
Type of Vehicle	0 1	1 2	2 3	3 4	4 5	5 6	6 7	7 8	8 9	9 10	10 11	11 12	12 13	13 14	14 15	15 16	16 17	17 18	18 19	19 20	20 21	21 22	22 23	23 24	Total
1. Car 																									
2. Taxi 																									
3. Van, pick-up 																									
4. Medium truck 																									
5. Heavy truck 																									
6. Truck-trailer 																									
7. Bus 																									
8. Motor cycle																									
9. Bicycle																									
10. Others																									
Total																									

BELURU/LONG LAMA/LIMBANG ROAD PROJECT

Appendix Fig. A-3-5 Hourly Distribution of the Road Traffic



Appendix Fig. A-3-6 Weekly Variation of Road Traffic



Appendix Table A-3-1 Samples of River Cargo Traffic Characteristics

Origin	Destination	Type of Vessel ^{1/}	Loading Capacity (ton)	Commodities and Weight	Travel Time (hr.)
Kuching	Marudi	Motor Launch (W)	100	General cargo - 80 ton	6 (days)
Sibu	Marudi	Oil Tanker (S)	150	Fuel (Diesel) - 150 ton	2 (days)
Long Lama	Miri	Barge (S)	450	Stone - 300 ton	13
Marudi	Long Lama	Motor Launch (W)	60	Sugar, Salt, Kerosine	8
Long Lama	K. Baram	Motor Launch (W)	60	Pigs, Rubber, Rice	20
Long Lama	K. Baram	Motor Launch (W)	30	Rice, Wood, Rubber - 6 ton	10
Long Lama	K. Baram	Tug Boat (S)	-	Pulling logs - 10,000 ton	30
Marudi	Long Lama	Motor Launch (W)	30	Sugar, Fertilizer	11
K. Baram	Marudi	Motor Launch (W)	30	Diesel - 30 ton	8
Long Lama	Marudi	Motor Launch (W)	30	Rottan - 20 ton	10
K. Baram	Marudi	Motor Launch (W)	60	Bricks, Wire	7
K. Baram	Marudi	Motor Launch (S)	20	Sugar, Rice, Cement - 20 ton	7
K. Baram	Tinjar	Motor Launch (W)	30	Diesel	14
Marudi	Tutoh	Motor Launch (W)	2	Biscuits, Drink	8
Marudi	Long Teru	Motor Launch (W)	15	Salt, Rubber, etc.	5
Long Ikang	Marudi	Motor Launch (W)	30	Banana, Pigs	5
K. Baram	Marudi	Motor Launch (W)	30	Car, Rice	7
Marudi	Tinjar	Motor Launch (W)	30	Vegetable, Drinks, etc.	11
K. Baram	Marudi	Motor Launch (W)	50	Oil, Plywood	9
Marudi	K. Baram	Motor Launch (W)	50	Rubber, Pepper, Rice	9
Marudi	Asampaya	Motor Launch (W)	5	Rubber, Drink	7
Marudi	Long Tutoh	Motor Launch (W)	10	Oil, Drink, Cement	10
Tinjar	Marudi	Motor Launch (W)	12	Rubber, Pepper, Paddy - 1 ton	7
Marudi	Bemang	Motor Launch (W)	3	Paddy, Fertilizer - 1 ton	5
Long Teru	Marudi	Motor Launch (W)	15	Rottan, Belian wood - 5 ton	7
Long Teru	Marudi	Motor Launch (W)	30	Pepper - 1 ton	6
Long Ikang	Marudi	Motor Launch (W)	8	Rubber, Banana	5
Long Teru	Marudi	Motor Launch (W)	30	Rubber, Pepper - 0.5 ton	7
Long Lama	Marudi	Motor Launch (W)	2	Food, Paddy, Rubber - 2 ton	8
Batu Gading	K. Baram	Tug Boat (W)	-	Pulling logs - 10,000 ton	12
Batu Gading	Marudi	Barge (S)	30	Stone - 12 ton	7
Marudi	Bakong	Motor Launch (W)	3	Biscuits, Drinks	6
Long Ikang	Marudi	Motor Launch (W)	10	Pepper, Banana, Rubber - 1.5 ton	7
K. Baram	Marudi	Motor Launch (S)	40	Diesel - 15 ton	6
Marudi	K. Apoh	Motor Launch (S)	25	Wire - 1 ton	8
Marudi	Long Lama	Motor Launch (W)	20	Rice, Drink	8
K. Baram	Marudi	Motor Launch (W)	30	Pigs, Fertilizer - 5 ton	7

Source : Interview survey conducted by consultant.

1/ W : Made of wood
S : Made of steel