A SOCIO-ECONOMIC STUDY OF THE COMMUNITIESLIVING WITHIN SUNGAI MEDIHIT WATERSHED, LIMBANG
Activity 1.1

BY

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COMMUNITY-BASED SUSTAINABLE FOREST MANAGEMENT OF SUNGAI MEDIHIT WATERSHED, SARAWAK, MALAYSIA

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A SOCIO-ECONOMIC STUDY OF THE COMMUNITIES WITHIN SUNGAI MEDIHIT WATERSHED, LIMBANG

1 INTRODUCTION

The *Community-based Sustainable Forest Management of Sungai Medihit Watershed, Sarawak*Project is the first and so far, only project in Sarawak, Malaysiasupported by the **ASIA-PACIFIC NETWORK FOR SUSTAINABLE FOREST MANAGEMENT & REHABILITATION (APFNet)**. The projectfocuses on **Sungai Medihit Watershed** in Limbang Division, northern Sarawak. The project'**s** main objective is to promote sustainable forest management in the watershed through community capacity building, innovative operational model demonstration and establishing a new governance mechanism in community development.

A socio-economic study of the local community is essential to gain a proper understanding of the local communities, their problems, aspirations and needs and attitudes towards conservation as well as the extent of their dependence on the available resources. This is basic to the formulation of a management plan for the area that will ensure that the conservation effort and future development will be socially and culturally acceptable to the communities. Thus, a socio-economic study of the communities living within the Sg Medihit Watershed was carried out in November 2016 and the findings are presented in this is report.

2 GENERAL DESCRIPTION OF THE STUDY AREA

The Sungai Medihit Watershed islocated in northern Sarawak, Malaysia,in a remote area of upper (Ulu) Limbang Division. The catchment has been estimated to cover an area of about 35,400 hectares. Sungai (Sg) Medihitflows north-northwest to its confluence with Sg Limbang at Long Napir. Most of the land within the catchment ishilly or mountainous. Lowland areas that are suitable for wet paddy cultivation and other agricultural crops arelimited.

Figure 1:Sg Medihit catchment- difficult and rugged terrain

Figure 2: Sg Medihit catchment views with BatuLawi in the background at the left

Most accessibleparts of the catchmenthave been logged while those within the vicinity of the Kelabit community's settlement have been cleared for shifting cultivation.

3 THE LOCAL COMMUNITIES, ACCESS TO THE AREA, AND INFRASTRUCTURE

Only two indigenous communities have settled within the catchment. These are the Kelabit and the Penan. The Kelabit community is located at Long Napir, near the confluence of the Limbang and Medihit rivers. It is a closely-knit community, occupying a longhouse and, due to space constraints, some individual units close to the longhouse (Figures 3 & 4). The Kelabit were the first occupants of Sungai Medihit catchment, having migrated from Long Seridan and Sg Adang to the Sg Medihit watershed more than 100 years ago, as evidenced by remnants of old settlements, burial sites and farmlands found in various places (Urud 2009).

Figure 3: Long Napir settlement

Figure 4: Long Napir longhouse

The Penan community is located at Kampong (Kpg) Bahagia, about fourkm upstreamof Long Napir. The Penan,formerly nomadic, were resettled by the government in the present area in 1972. They have built individual houses with or without government assistance(Figure 5). Some of them have built better houseswith income from employment in logging camps, schools and as farm labourers. Since settling in the area both communities have been living harmoniously, lending support to one another.

Figure 5: Penanhouses at KpgBahagia

The catchment isin aremote area isolated from mainstream development. Formerly, the only means of transportation to the area was by longboat, and the journeyfrom Limbang along the Limbang River, and then the Medihit River,took about a day . However, with the advent of logging the community now no longer usesriver transport to travel to Limbang townbut depend on logging roads constructedacross the catchment.The logging company Limbang Trading (L) SdnBhd built the Wong Fujita steel bridge – thefirst such bridge across Sungai Limbang, with a span of 80m in 1981 (Figure 6). The company also constructed a feeder road from the main logging road to Long Napir, which has greatly improved accessibility. The journey to Limbang towntakesthree to four hours by 4-wheel drive.

Figure 6:The Wong Fujita Steel Bridge across Sg Limbang

A number of local community members have purchased motor cycles and cars, or even 4-wheel drive vehicles, with earnings fromlocal employment, especiallyin logging camps, to make the most of thebetter access to Limbang town, At the time of the study, 80% of the Long Napir households owned motorcycles; eight persons owned a4-wheel drive vehicle and two persons owned sedan cars. Thirty of the PenanofKpgBahagia own a motorcycle despite the fact that road access to their village is still difficult.

Basic infrastructure and public amenities in the catchment were still poor at the time of the study. A Primary School built in the 1960s provided early education to the Kelabit children of Long Napir.A new government primary school (SekolahRendahKerajaan Long Napir), built near the present village in the 1980s (Figure 7) caters for the children of both communities up to primary six level.On completion of their primary education school children can continue theireducation at government secondary schools in Limbang town, either at SMK Limbang or SMK Medamit.Currently, fewer Kelabit and more Penan children are studying in the primary school(about 50 attend SK Long Napir).

The Kelabit of Long Napir realized and valued the importance of education from the early days andat least ten Long Napir Kelabits hold degreeswhile some have completed diplomas and technical training. This is a great achievement for the community despite its remoteness and the hardship that the students had to cope with in the early days. The Penan community settled much later on and has about ten members who have completed their education with the highest up to Form Five level. Currently, three Penan children from KpgBahagia are attending vocational training.

Figure 7: SK Long Napir (government primary school)

Basic infrastructure and amenities for both communities include a gravity-fed water supply from Sg Medihit, upstream of the settlements. The government is in the process of building a water treatment plant.Each community has a community generator set provided by the governmentand a number of individualsown their own generator sets, thoughtheir use is limited due to the high cost of diesel fuel and maintenance. The government is building a solar powered generator for the communities. In addition, there are plans for a new Health Clinic to cater for the two communities and the proposed site is near Long Napir (Figure 8).

Figure 8: Site of proposed rural health clinic at Long Napir

Figure 9: Maxis transmitting tower and solar-powered public phone

A transmission tower for telecommunication is constructed in Long Napir by the state government which provides valuable, though somewhat limitedaccess to the outside world (Figure 9) allowing both communities to communicate with their families elsewhere and to market their products. Currently, only Maxis line is available through this tower.

4 STUDY SCOPE, OBJECTIVESAND METHODS

The Terms of Reference for this socio-economic studyconfine the scopeto the communities living within the Sg Medihit Watershed, namely Long Napir and Kampong Bahagia. The study aimwas primarily to describe the existing socio-economic situation of the target communities and to find out their attitudes, needs and problems in the context of the conservation and management of the watershed. Specifically, the main tasks were:-

1. To collect and analyse the socio-economic data on the communities, including the demographic characteristics of the communities, such as their household size, and composition; their land use and major socio-economic activities;
2. To assess the dependency of the communities upon forestry resources, including utilization of its timber and non-timber products, including hunting, fishing, and collection of jungle products;
3. To determine the perception and attitude of the communities towards the management and conservation of the watershed; and
4. To recommend appropriate strategies and project initiatives to sustainably manage the watershed and to improve the socio-economic status of the local community to enhance their participation in the sustainable management of the areas.

Observations and focus group and personal interviews using structured questionnaires were carried out during field visitswith a view to gaining an in-depth understanding of the community(Figure 10). The village headmen and other knowledgeable persons were interviewed to obtain general information on the village.Heads of households residing in the villages were the target respondents for detailed in-depth interviews. Group interviewswere conducted to obtain opinions as to the communities' problems and aspirations.

Figure 10: After an interview session at KpgBahagia

(Consultant 2nd right; village headman 3rd left)

Almost all of the households in the two villages were interviewed (Table 1).

Table 1: Total number of households selected for the survey

Kampong	No. of heads of households	No. (%)of Respondents
Long Napir	44	40 (91%)
Kampong Bahagia	35	28 (80%)
Total	**79**	**68 (86%)**

5 DEMOGRAPHICS OF THE LOCAL COMMUNITIES

5.1 Population

The total population of the two villages wasless than 300(Table 2). Long Napir has 44 households, but only 120 individuals. Field observations revealed that a number of the houses in Long Napir were practically empty with only elderly parents in residence, looking after their houses and farms.

Table 2: Total populationof the two communities

Kampong	Name of Headman	No. of heads of households	Total population
Long Napir	T.K. Jangin Tai Bilong	44	120
Kampong Bahagia	T.K. LejuRigung	35	178
	Total	**79**	**298**

The most significant observation was that there has been a movement of the Kelabit to urban areas.The Long Napirpopulationwas said to have declined in recent years and many locals agreed, or at least accepted the view that more and more young people have migrated to urban centres.Aconsiderable proportion of the young and economically active people from the village have attended school,obtained qualifications and migrated to, or found remunerative employment in Miri, Kuching and other major towns in the country. Themajority are employed in the public services as teachers, nurses, administrators, police etc. Some are studentswho attend schools in town, others housewives.Students will eventually take up employment in towns rather than farm in their remote village.However, those who have out-migrateddo occasionally come back to their villages, especially to visit their aging parents and during festive seasons like Christmas.

The older generations are too steadfast to leave but some do join their working children. Hence, those remaining behind are mostly the elderly, the youngsters and some government employees and their families.General observationssuggest that if the existing situation prevails sout-migration will continue with a decline in the local population. However, it would be wrong to assume that the villagewilleventually become deserted. Many people prefer to remain in the area because of sentimental and traditional attachments. In the final analysis, it can be concluded that the areas are under populated and from the population size alone it is difficult to justify bringing costly development to the areas. However, development considerations have to take account of other factors as well.

5.2 Household size

The household is the basic unit of the Kelabit and Penan communities. The household hereincludes members whowere residing at homeat the time of the survey as well asthosewho were temporarily away from the villageincluding students at school elsewhere and those employed elsewherebut still contributing to the household income.

Typically, the most senior male in the family heads thehousehold (or the most senior femalein the case of families headed by a widowor a single mother). Families can be nuclear(comprising the parents and their offspring) or extended (withadditionalfamily members living in the household). Sometimes, ahousehold comprises only old people whose children have married away from the settlementor left to work and/or reside elsewhere. Suchhouseholdscan is rather small. The average household sizein the survey area was 4.3

persons:2.4 persons at Long Napir (with a range ofone to nine persons) and 3.5 persons in KpgBahagia(with a rangeof oneto sevenpersons)(Table 3).

Table 3: Distribution of Surveyed households by size

Household Size (no. of persons)	Long Napir household members		KpgBahagia household members	
	Number	Percentage	Number	Percentage
1-2	29	72.5	10	35.7
3-4	4	10	8	28.6
5-6	6	15	7	25
7-8	0	0	3	10.7
> 8	1	2.5	0	0
Total	**95**	**100**	**97**	**100**
Average	**2.4**		**3.5**	
Range	**1-9**		**1-7**	

5.3 Economically active and dependent status of surveyed population

Determination of the composition of the surveyed population in terms of whether they are economically active ordependent will reflect on the potential manpower and the number of dependent persons that the individual households have to support.

For the purpose of this study**'Economically Active persons'are those from 16-65 yearsold, excluding the handicappedand those above 16 but still studying, while 'Dependent persons'are those below 16,including those above 16 but still schooling, and those above 65.** In the rural setting and under socio-economic pressures and needs to take care of the family, even those older than70 maystill work in the farm as long as they are healthy.

The surveyed households had more economically active than dependent persons,except in the case of Kelabit households where elderly parents were looking after their house.The Penanhad more economically active persons than the Kelabit(67% andan average of 2.3 persons per household compared to 58%and an average of 1.4 persons per household (Tables4and 5). Generally, the Kelabit households were characterized by the presence of older people and labour shortageswere thus not uncommon in households with few adults. The current size of the economically active Kelabit population may be, to certain extent, affected by the rural-urban drift. Therefore, the most important feature to be noted in the implementation of any future project is the limited available manpower. This problem currentlyimposessevere limitations on agricultural activities, particularly in the Kelabit households, althoughthey are able to hire the Penan to work on their farms and do other workon a temporary basis.

Table 4: Distribution of surveyed population by economically active members per household

No. of economically active	Long Napir	KpgBahagia

membersper household	Frequency	Percentage	Frequency	Percentage
0	14	35	4	14
1-2	21	**53**	18	**65**
3-4	4	10	2	7
5-6	1	3	4	14
>6	0	0	0	0
Total	**40**	**100**	**28**	**100**
Average	**1.4**		**2.3**	
Range	**0-6**		**1-5**	

Table 5:Distributionsurveyedpopulation by dependent membersper household

No. of dependent members per household	Long Napir		KpgBahagia	
	Frequency	Percentage	Frequency	Percentage
0	22	55	13	46
1-2	13	33	9	32
3-4	5	13	6	22
5-6	0	0	0	0
7-8	0	0	0	0
>8	0	0	0	0
Total	**40**	**100**	**28**	**100**
Average	**1**		**1.1**	
Range	**0-4**		**0-4**	

5.4 Gender ratios

Both communities had more males (56% of the surveyed Kelabit population in Long Napir and 61% of the Penan population in KpgBahagia) than females (Table 6).

Table 6: Composition of surveyedhouseholds by gender

Settlement	Total households	No (%) of males	No (%) of females	Total Population
Long Napir	40	53 (56%)	42 (44%)	95
KpgBahagia	28	59 (61%)	38 (39%)	97
Total	68			192

5.5 Age distribution of heads of households

The age structure distribution of household heads (Table 7) revealed that those in Long Napir were aging (57% fell within the range of 50 – 80 years with an average age of 55 and a range of 22 to 89 years) while the Penan household headshad a younger age distribution (53% were within the 30 – 39 yearage group with a much lower average age of 43 years old and a range of 26 to 75 years).

Two Kelabit household heads older than 80 years happened to be lone rangers and preferred to stay home looking after the house rather than following their children who were working elsewhere.

Table 7:Agedistribution of the surveyed household heads

Age range (years)	Long Napir		KpgBahagia	
	Frequency	Percentage	Frequency	Percentage
21-30	4	10	5	18
31-40	2	5	6	**21**
41-50	9	**22.5**	9	**32**
51-60	9	**22.5**	4	14
61-70	5	**12.5**	3	11
71-80	9	**22.5**	1	4
> 80	2	5	0	0
Total	**40**	**100**	**28**	**100**
Average	**55**		**43**	
Range	**22-89**		**26-75**	

5.6 Household heads'educational attainments

The Kelabit household heads showed some relation between age rangeand educational attainment.About 22.5% had had no chance of formal educationas the school hadyet to beestablished. Nevertheless, 57.5% had completed their secondary education and two household heads hold degrees. The percentage of Penanhousehold heads withno formal education is about the same at 21%, and the great majority (68%)had onlycompleted primary education. Two household heads had completed lower secondary and another hadcompleted his education up to form five (Table 8).

Table 8:Educational level attained by the surveyed household heads

Educational level	Long Napir		KpgBahagia	
	Frequency	Percentage	Frequency	Percentage
None	9	22.5	6	21
Primary	10	**25**	19	68
Lower Secondary	13	**32.5**	2	7
Upper Secondary	6	15	1	4
Diploma	0		0	0
Degree	2	5	0	0
Total	**40**	**100**	**28**	**100**

5.7 Household heads'main occupations

The survey results indicated that the greatest percentageof household heads(38% of those in Long Napir and 50% of those in KpgBahagia)considered farming to be their main occupation.Some had no occupation due to old age and/or ill-health.The Kelabithousehold

heads, being better off and more enterprisingthan the Penan, were involved in a rangeof gainful activitiessuch as work as truck and excavator drivers with logging companies;operatinga village shop;orproviding transportation services to Limbang town (Table 9, Figure11). The Penan were largely involved in farming and labouring.

Figure 11:Village shop and transport operator

A number of the Kelabit and Penan household heads were employed atSKLong Napiras security guards, gardeners, cooks and cleaners. A number also worked as farm labourers and in the constructionand repair of houses in the village (Table 9).The Kelabit depended very much upon Penan especially for farm work while the Penanneeded the workto earn acashincome.

Table 9: Household heads' main occupations (Sarawak Poverty Line: RM990 (poor) and RM660 (hardcore poor), 2017)

Main occupation	Long Napir		KpgBahagia	
	Frequency	Percentage	Frequency	Percentage
None	6	15	4	14
Full-time Farming	**15**	**38**	**14**	**50**
School Security Guard	4	10	1	4
Teacher	1	2.5	0	0
School gardener & cleaner	3	7.5	0	0
Retired from government service	1	2.5	0	0
Pastor	1	2.5	0	0
Village shop operator	2	5	0	0
Transporter	3	7.5	0	0
Excavator operator	1	2.5	0	0
Truck driver	1	2.5	0	0
Labourer	2	5	9	**32**
Total	**40**	**100**	**28**	**100**

6 LAND OWNERSHIP AND USE

The land occupied by the Kelabit and Penancommunities in the area is classified, invariably, as Native Customary Rights (NCR) Land. Individual households (or household members) hold or own certain areas of land within their kampong territoryestablished mainly through rights

acquired by felling primary forest under shifting cultivation or inherited from their ancestors.Land is avaluable asset to farming communities in rural areas so it is important to determine the size of the communities' and individuals'landholdings and the extent of their landutilization.

The surveyed households were asked to estimate the number of parcels, and area (acres)of land they own. Nofurther verification was attempted. The survey distinguished between land currentlyplanted with crops (utilised)and land that was currently fallow(non-utilised)but may be usedfor planting rotations ofhill paddy in the future(Tables10 to 15).

The Kelabit households were utilizingmore parcels than the Penan (27.5% and 25% of the Kelabit owned threeand five parcels of landrespectively while 57% of the Penan households owned one ortwo parcels of land) (Table 10).

Table 10: Total number of parcelsof land beingutilised by surveyed households

Total parcels (Lots)	Long Napir		KpgBahagia	
	Frequency	Percentage	Frequency	Percentage
0	6	15	6	21
1	4	10	9	**32**
2	8	20	7	**25**
3	11	**27.5**	2	7
4	0	0	1	4
5	10	**25**	2	7
>5	1	2.5	1	4
Total	**40**	**100**	**28**	**100**
Average	**3.1**		**2**	
Range	**1-6**		**1-6**	

The Kelabit households were utilizinga greater acreage of owned land than the Penan (48% of the Kelabit households were utilizing 10 to 20 acres for various crops, with an average of 14 acres per household while53% of the Penan households were utilizing fewer than 10 acres with an average holding of 8.2 acres Table 11).

Table 11:Total acreage of land being utilised by surveyed households

Total acreage	Long Napir		KpgBahagia	
	Frequency	Percentage	Frequency	Percentage
0	6	15	2	7
<10	4	10	13	**46**
10-19	19	**47.5**	10	36
20-29	10	25	3	11
30-39	1	2.5	0	
>40	0	0	0	
Total	**40**	**100**	**28**	**100**
Average	**14.0**		**8.2**	
Range	**5-30**		**2-25**	

A considerable proportion of the land belonging to bothcommunities wasfallow.Thirty eight percent38% of the Long Napir households owned10 to 15unutilised parcels of land (an average of nine parcels per household) while 43% of the Penanhouseholds ownedone to ten parcels with an average of six parcels per household (Tables 12 & 13).

Table 12: Total parcels of non-utilised land among surveyedhouseholds

Total parcels	Long Napir		KpgBahagia	
	Frequency	Percentage	Frequency	Percentage
0	10	25	12	43
1-9	9	23	12	**43**
10-14	15	**38**	2	7
15-20	3	8	1	3.5
>20	3	8	1	3.5
Total	**40**	**100**	**28**	**100**
Average	**9**		**6**	
Range	**0-20**		**1-20**	

Meanwhile, 35% of the Long Napir households owned 50 to 60 acres of land with an average holding of 48 acres per household while 29% of theKpgBahagia households owned 20 to 30 acres with an average holding of 28 acres per household.

Table 13: Total area (acres)ofnon-utilised land owned bysurveyedhouseholds

Total area (acres)	Long Napir		KpgBahagia	
	Frequency	Percentage	Frequency	Percentage
0	6	15	5	18
10-19	3	8	5	18
20-29	5	13	**8**	**29**
30-39	2	5	4	14
40-49	1	3	0	0
50-59	**14**	**35**	2	7
60-69	1	3	2	7
Over 70	3	8	2	7
Total	**40**	**100**	**28**	**100**
Average	**48**		**28**	
Range	**0-200**		**6-100**	

Overall, the Kelabit and Penan communities living in SgMedihitwatershed own relatively vast tracts of land scattered in several parcels all over their village territory.None of the Kelabit households are landless as even newly established households have inherited land from their parents or ancestors. However, four of the newly established Penan households were landless.

Kelabit households in Long Napirownan average of11parcels of land (with a range of 3 to 25),totalling an average of 60 acres (with a range of15 to 225 acres) per household. The

PenanhouseholdsinKpgBahagiaownan average of7 parcels of land (with a range ofzero to 20 parcels),totalling an average of 42 acres (with a range of6 to 100 acres) per household (Tables 14 & 15).

The results indicated great disparity in terms of agricultural land resources among the households surveyed, especially among the Kelabit of Long Napir.Some households own areas that exceed their immediate needs while others had only small acreages. About20% of Kelabit households owned over 100 acres and 25% of them owned 60 to 70 acres, whereas 46% of the Penan households owned 20 to 40 acres (Table 15). Inequality in land resources depends very much on areas of land inherited from householders' forefathers and their early pioneering spirit in opening up of new areas for cultivation.

Table 14: Total parcels of land owned bysurveyedhouseholds

Total no. of parcels	Long Napir		KpgBahagia	
	Frequency	Percentage	Frequency	Percentage
0	5*	12.5	4#	14
1-10	10	**25**	18	**64**
10-15	11	**27.5**	3	11
15-20	6	15	2	7
20-25	5	12.5	1	4
> 25	3	7.5	0	0
Total	**40**	**100**	**28**	**100**
Average	**11**		**7.0**	
Range	**3-25**		**0-20**	

Note:
* - 5 Kelabit households withincomplete data
# - 4 Penan households landless

Table 15: Total land area (acres) owned bysurveyedhouseholds

Total land area (acres)	Long Napir		KpgBahagia	
	Frequency	Percentage	Frequency	Percentage
0	5*	13	4#	14
1-10	0	0	1	4
11-20	1	2.5	1	4
21-30	3	7.5	6	**21**
31-40	5	13	7	**25**
41-50	2	5	2	7
51-60	1	2.5	2	7
61-70	10	**25**	1	3.5
71-80	5	12.5	3	11
81-90	0	0	0	0
91-100	0	0	1	3.5
> 100	8	**20**	0	0
Total	**40**	**100**	**28**	**100**
Average	**60**		**42**	
Range	**15-225**		**6-100**	

Note:
* 5 Kelabit Households with incomplete data
# 4 Penan Households landless

7 THE COMMUNITIES'MAIN ECONOMIC ACTIVITIES

Both communities were involved in a number of economic activities (Table 16).

Table 16: The communities'main agricultural activities

Agriculturalactivities	Long Napir		KpgBahagia	
	Frequency	Percentage	Frequency	Percentage
Hill paddy	17	42.5	20	71
Wet paddy	9	22.5	0	0
Rubber	29	72.5	17	61
Fruit trees	22	55	17	61
Pepper	4	10	0	0
Sago	0	0	11	39
Medicinal plants	0	0	1	3.5
Fishpond	5	12.5	0	0
Livestock				
- Chicken	8	20	7	25
- Pig	13	32.5	3	11
- Buffalo	1	2.5	0	0
Total	**40**		**28**	

The two communities' main economic activity within the catchment is shifting cultivationof hill paddy.Shifting cultivation of hill paddy was the Kelabittraditional practice, but now the area planted has been greatly reduced due to lack of manpower. Overall, 63% of the households in Long Napir and 71% of those in KpgBahagia reported that they had planted paddy in the last season.

The main objective of planting paddy was to produce enough rice for their own needs for the year(most households are thus subsistence farmers).Planting paddy is one of the hardest jobs yet with very poor productivity. No household managed to produce enough for their family, low productivity reportedly being due to poor soils, lack of agricultural inputs, poor maintenance and pest and disease attacks. The survey results indicated that almost all the households in both villages, butespeciallytheKelabit households, purchased rice to fulfil their requirementsfromLimbang town. (A few Penanfamiliesuse sago as their staple).Long Napir households spent on average around RM1,600 (ranging from RM480 to RM3,360) last year whiletheKpgBahagiahouseholdsspent an average of around RM1,380.00 a year(ranging from RM600 to RM3600).

Only 22.5% of the Long Napir households and none of the Penan households planted wet paddy, largely because there is limited land suitable for wet paddy cultivation in the areaat Long Napirand none at all atKpgBahagia.

Rubber and some indigenous fruit trees like durian,rambutan, jackfruits and dabai were the next most popular items that both communities planted. Rubber is considered a hardy and low maintenance tree that can be grown even on difficult terrain. Moreover, some consider maturerubber trees to be a 'saving bank'as they can be tapped and the latex processed into rubber sheets, which are not perishable like other agricultural products and can be accumulated for salelater.

Pepper and sago were the other major crops the communities planted. Ten (10) percent of the surveyedLong Napir households had ventured into pepper planting in view of the current good pepper price. None of those who planted pepper obtained any government assistance. Sago(Figure 12), the Penan traditional staple, was planted by 39% of the Penan households for their own consumption.

Figure 12: Sago planted near the house


Figure 13: Chicken rearing project

The two communities'other major agricultural activities are livestock rearing. Both communities rear chickens and pigs, not only for their own consumption but also for sale. Thirteen (32.5%) of the Long Napir households reared at least two,to a maximum of ten pigs. Pigs are commonly reared as householders can feed them on locally produced foods such as tapioca, yam and left-oversfrom the school. They can easily sell the meat among themselves or to loggers at an average price of RM10 per kg. Households quite commonly keep a few chickens for their own needs.A number of those who have been assisted by the project have reared up to 50 (the Penanhouseholds) or 100 (the Kelabithouseholds)chickens(Figure 13). Chickens can easily be sold locally to the school teachers and loggers.

Only one household, headed by the Ketua Kampong (Village Headman) of Long Napir, reared buffalo (he has eight). The Kelabit communityconsidersbuffalo rearing important- it is an integral part of Kelabit marriage traditions and buffalo are used to farm wet paddy and for transportation in the Bario highlands. Thus, buffalo rearing has potential.

Freshwater fish are still available in the rivers so aquaculture is still not popular among the communities. Only 12.5% of the surveyed Long Napir households, and none of the Penan,reported rearing fish in their fishponds.

Vegetablesandfruits are plantingon a small-scale basis mainly for home consumption. They have good potential as cash crops but there is little incentive to growthem in the area due to limited access to markets.

Overall, agricultureisstilltheeconomicmainstay of the Kelabit and Penan communities in the catchment. Unfortunately, agricultural productivity has been rather low. Major limiting factors for agriculture and plantation crops are land suitability, the remoteness of, and poor access to the settlements and transportation problems. Thus, both communities are still living barely at subsistence level, RM660 (hard-core poor) and RM990 (poor). Poverty still prevailedamong the surveyed householdsin the area, particularly the Penan.Transportation and marketing difficultiesare another limiting factor for agriculture production in the area. As such, agriculture in the area is still very much under-developed.Furthermore, relatively large areas of land of difficult, rugged terrain are not utilised for any crops as they are mostly not really suitable for agriculture.Only tree crops such as rubber and fruit trees can be grown in such places.

Employment as tractor and truck drivers by the logging company provides an income forquite a number of people. Government jobs are limitedtoschoolsecurity guards, gardenersor cleanersas this is the only government agency. Two households operate small-scale retailing businesses to cater to the local communities'basic needs. A few enterprising villagers use their 4-wheel vehicles to provide transportation services (Figure 14) to community membersat RM30 per passenger to and from Limbang town.

Figure 14:A 4-wheel drive vehicle ready for transportation

8 DEPENDENCE ON FOREST AND FISHERY RESOURCES

8.1 Dependence and extent of utilisation

Both communities still depend very much on forest resources such asfreshwater fish, wildlife and jungle produce, for their own use as well as to earn supplementary cash for basicnecessities. Logging has resulted in forest resources depletion and river pollution.

It is important tounderstand the extent of communities' living dependence on and utilization of existing forestry resourcesto be able to conserve and sustain the resources. As communities whose lives are closely associated with forest, the Kelabit and Penan in the

Medihit watershed definitely depend, to varying degrees, on the forest for their sustenance and livelihood, although detailed study has yet been done.There are indications that the communities commonly undertakeforest-related activities. Most of the materials that they need for their daily use, such as timber for houses, areobtained from the nearby forest. Although some consideredcollection of forest resources as a pastimeothers depended heavily on hunting and fishing to supply their meat and fish protein needs as well as to supplement their cash income. The extent to which the communities in the area depend on these activities can be seen from Table 17.

Table 17: Dependence of the communities on forest resources

Forest resources	Long Napir			KpgBahagia		
	Household heads involved		Highest frequency (% involved)	Household heads involved		Highest frequency (% involved)
	No.	%		No.	%	
Collection of wild vegetables	21	53	1/week (95%)	15	54	1/week (60%)
Hunting	16	40	1/week (63%)	13	46	1/week (54%)
River fishing	23	58	1/week (61%)	15	54	1/week (60%)
Frog catching	3	8	1/month (All)	12	43	3/week (67%)
Rattan collection	0	0	0	12	43	3/week (58%)

The most frequently hunted and sought after game are wild boar*(Sus barbatus)*, rusa (*Cervus unicolor*), kijang*(Muntiacus spp.)* and other smaller animals. The communities' main aim in hunting was to get wild boar, and this was the most commonly caught species partly because compared to other animals, wild boar are more prolific and therefore still relatively plentiful in the neighbouring areas. Rusa, kijang and other smaller animals are often hunted incidentally and considered secondary though they are also equally sought after. Actually most hunters in the areaconsidered that rusa and kijang are getting scarce and harder to find compared to wild boar. The larger portion of the wild meatwould normally be sold locally or even brought to Limbang town for better price, while some was used for households' own consumption.

About 40% of the Long Napir households reported involvement in hunting at least once a week and, if lucky, they can make about RM175 to RM240 from wild boar meat per hunting trip. Hunting is even more common among the Penan as it is one of their means to earn cash. Almost half (46%) of the Penan households were involved in hunting at least once a week. It has been estimated that they can make about RM100 to RM300 per hunting trip from sale of meat.

Fishing in the rivers in the watershedis another important local community activity.The communities' respective villages are located close to the river (Sg Medihit) and fishing is confined mainly to rivers nearby. More than half of the surveyed households of both communities fishedat least once a week and it was not uncommon for community members to fish almost daily to supply their immediate needs. The major,important and most sought after fish species caught are ikansemah (*Tor duronensis)*, tenggadak (*Puntiusschwanenfeldi*), and baong (*Mystus spp*.). Most villagers used traditional fishing methods such as line, cast nets and drift nets, being aware of the need to ensure a continuous supply of fish in their

rivers. They also sell much of their catch, especially high value fish such asikansemah and tenggadak,in order to earn cash.It has been estimated that Long Napir fishermen can make RM70 to RM400 per fishing trip (if they can get ikansemah) and Penan fishermenRM20 to RM200 per fishing trip.

Catching frogs is quite popular among the Penan - 43% of the surveyed households reported they did so at least thrice a week, compared to only 8% of the Long Napir households at a frequency of just once a month, largely because frogs are getting much harder to find.

Collection of wild vegetables and non-timber forest products such as rattan and medicinal plants is another important activity by which most of the households supplemented their food supply and cash income.Local community members have an intimate knowledge of the forests and are familiar with wild jungle products such asferns, bamboo shoots and edible and medicinally useful fungi. These are collected for their own consumption while rattan is collected either for sale or for useinmaking mats, baskets and other handicrafts.Unfortunately, the resources are dwindling and rattan is getting harder to find and collectors have to go deeper into the forest to find the stock.

9 PERCEPTIONSTOWARDS THE PROJECT ANDCATCHMENT MANAGEMENT

It is essential to gauge the local communities'perceptions and views towards the catchment area itself and theproject,ifthe SgMedihitwatershed is to be well and sustainably managed and community participation in its management for sustainable useenhanced. The assessment and analysis of their current perceptions and attitudes towards the project can provide insights and inputs for the formulation of strategies and watershed management action plans.

9.1 Perceptions of the project

A great majority of the surveyed households had prior knowledge of the project and its aims to assist the community in the area (Table 18)duetoa number of dialogues and visits by project team members to the two villages.

Table 18: Percentage of householdswithprior knowledge of the Project

Prior knowledge of project	Long Napir		KpgBahagia		Overall	
	Frequency	%	Frequency	%	Frequency	%
√	38	95	27	96	65	96
x	2	5	1	4	3	4
Total	**40**	**100**	**28**	**100**	**68**	**100**

Figure 15:Community Engagement with Penan Community (Project Coordinator at left)

The great majority (80%) of those in Long Napir knew about the project through the project team coordinator, community dialogues and active involvement in the project (Figure 15). Only 50% of the Penan knew about the project through project team coordinator and dialogues, being less actively involved in the project, while another 50% knew about the project through their neighbours and friends (Table 19).

Table 19: Source of information about the project

Source of information about the project	Long Napir		KpgBahagia		Overall	
	Frequency	%	Frequency	%	Frequency	%
Project coordinator & consultants	25	62.5	10	36	35	52
Community dialogues	7	17.5	4	14	11	16
Friends & neighbours	8	20	14	50	22	32
Total	**40**	**100**	**28**	**100**	**68**	**100**

The overwhelming majority of the surveyed households (95% in Long Napir and all of the Penan households) were very supportive of the government's efforts to conserve the neighbouring forestsas they appreciate the values of the forest and its resources and the potential of project initiatives to help sustainably manage the forest in the vicinity. They welcomed the project efforts and initiatives towards conserving the catchment as they feared that the current logging activities might extend further into the remaining forestsandfurther damage the environment and deplete the available resources. They suggested that logging activities within and around the vicinity should be reduced, if not completely stopped, to maintain the existing quality of the environment.

Community members consideredthatthe project could benefit them in terms of improvingbasic amenities and existing infrastructure. At the same time, they hoped that the implementation of socio-economic and income-generating projects could help improve the their socio-economic status. They hadalreadyseen the project assist some of their members succeed in some income-generating projects such as chicken rearing, vegetable gardening and running homestays. As such, the communities welcomed the project and proposed that more communal projects be implemented in their villages to benefit the whole community. The challenge is how to sustain the activities. The improvement of the existing motorcycle track from Long Napir to KpgBahagiato a road suitable for 4WD vehicles will provide KpgBahagiawith better access.

9.2 Perceptions towards forest and its resources

Forests and forest resources are of great value to the two communities living in the catchment and they have depended on the forests for a supply of food and other basic needsfor many years and will continue to do so. Local communities are very concerned about the availability of resources within SgMedihit Catchment areasdue to their strong attachment to their land and nearby forests.They can also obtain supplementary income though sale of forest products even though supplieshave dwindled over the years. They realize the importance of, and need to conserve the forest environment to ensure a continuous supply of food and other valuable products. In view of this, it is crucial that the project determine the local communities'perceptionstowards the resources and surrounding environment, whichinclude forestry, fisheries, wildlife and rivers, and how the communities rate them in terms of their current status and quality.

Forest resources availability and environmentalquality were found to bemoderately poor to poor. Agreat majority of the households in both villages considered their river, fishery and wildlife resources to be in poor state(Tables 21 and 22) as based on their observations and personal experiences in terms of their catch, the resources are dwindling. Most of the villagers felt that there arenowfarfewer fish than ten years ago. The rapid decline in fish populations has been largely due to increasing riverpollution resulting from logging and earthworks in the catchment, as well as over fishing. The situation is worsened as improved accessibility to the areas has resulted inmore and more outsiders, who have no sense of belonging to the area, coming all the way from Limbang to hunt,fishand collect jungle produce the catchment.

Forest resources include medicinal plants, rattan, sago and indigenous fruits. The Kelabit and Penan have different views on these - more half of the Kelabit households rated them as moderately poor while the majority of the Penan households rated them as poor (Table 20). Their rating could be influenced by the extent of their dependence on and utilization of the resources as the Penan used more of these resources that the Kelabit.

Table 20: Perceptions of the two communities towards forest resources

Resources	Ratings											
	Long Napir community						KpgBahagia community					
	Poor		Moderate		Good		Poor		Moderate		Good	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Forest resources												
Medicinal plants	18	45	22	**55**	0	0	17	**61**	10	38	1	4
Rattan	18	45	22	**55**	0	0	19	**68**	9	35	0	0
Sago	16	40	23	**58**	1	2.5	17	**61**	11	42	0	0
Indigenous fruits	17	43	23	**58**	0	0	17	**61**	11	42	0	0
Others	14	35	23	**58**	3	7.5	15	**54**	12	46	0	0
River quality	26	**65**	14	35	0	0	26	**93**	1	4	0	0
Fishery resources	26	**65**	14	35	0	0	24	**86**	3	12	0	0
Wildlife resources	26	**65**	14	35	0	0	25	**89**	2	8	0	0

9.3 Measures for watershed conservation and management

The surveyed households were asked to express their opinions regarding possible measures that the authorities could take in order to sustainably manage and conserve the catchment and its dwindling resources, which they did(Table 22). Project management and the local communities all have a role to play in a concerted effort tomanage the catchment.

Table 21: Suggestions as to how the community and government can conserve the catchment area

Proposed measures	Long Napir		KpgBahagia		Overall	
	Freq.	%	Freq.	%	Freq.	%
Reduce or stop logging & plantation activities in the areas to prevent river pollution & further forestdestruction Authority to monitor illegal activities with the villagers'cooperation	26	**65**	15	**58**	41	**62**
Forest Department Sarawak to undertake rehabilitation &conservation work with community participation and allocate certain areas for community use	8	**20**	4	15	12	**18**
Authority to strictly enforce regulations and prevent outsiders from hunting, fishing or doing any illegal activities in the catchment	4	10	4	15	8	12
More frequent dialogues & consultations between stakeholders including the local communities in planning future projects Undertake forest management & conservation projects for the benefit of both communities	2	5	3	12	5	8
Total	**40**	**100**	**26#**	**100**	**66**	**100**

Note: # - 2 no response

The communities' pressing need is for resource conservation. Their top proposition is that**thegovernmentreduce or stop logging and plantation activities in the area**. Authorities such as Forest Department Sarawak should continuously monitor the catchment with the cooperation of the villagers to detect any illegal activities. This is crucial in order to prevent river pollution and avoid further destruction of the neighbouring forests. The great majority (62%) of the surveyed households proposed thisidea, particularly the Kelabit (65%). However, if logging is to continue the activities should be under strict control of the authorities concerned to prevent encroachment by loggers who may indiscriminately destroy the environment and deplete the available resources.

The next most important proposal (closely related to the first)isthat Forest Department Sarawak undertake rehabilitation andconservation work with community participation, and simultaneously, the government allocate certain areas not only asaforest reserve buffer

zone but for community use to cater for their basic needs such as timber for their building materials and other jungle products.

Thesurveyed households expressed the need for stringent government enforcement measures to prevent indiscriminate exploitation of the available resources and address theincreasingthreat of outsiderscoming into thecatchment to hunt, fish and collect jungle produce and thereby deprive local community members of forestry resources.Localcommunity membersshould be given priorityto enable them to meet their basic needs.

Additional suggestions:

- Implement more socio-economic projects, including income-generating projects such as chicken community rearing and vegetable gardening
  The surveyed households expressed their dire need for socio-economic and income-generating community projects to improve their livelihoods and socio-economic status. More income-generating projects, such as livestock rearing and vegetable gardening, and promotion of handicrafts and ecotourism, need to be implemented especially among the Penan in order to provide them with a source of cash, which can reduce their dependence on forest resources.
- Level the old Long Napir village area for a village extension
  This is a socio-economic projectmeant to improve the community's living conditions
- Protect riverbanks to prevent erosion affecting houses
- Laygravelon the road and develop drainage system for the villages
- Construct a multi-purpose hall, playground and other recreational facilitiesfor the children
- Establish tagang systems for conservation of indigenous and high value fish
  The project mayconsiderproposingthatthe Department of Agriculture assist them to establish a tagang system toconserve their indigenous and high value fish as existing fish stocks and suitable stretches riversstillremain.
- Promote ecotourism
- Continue to assist community members in maintaining the existing logging road to their kampongs for their transportation and marketing of their products.
  The existing logging road is the communities' lifeline so they would like the government and the logging company to continue to assist them to maintain the roads to their kampongs not only to ease transportation but to help themmarkettheir products.

10 THE COMMUNITIES'MAIN PROBLEMS AND FELT NEEDS

Although the problems faced by the Kelabit and Penan in the catchment are generally similar to those faced by other groups in Sarawak'sremote interior, they may perceive their real problemsdifferently. It is therefore appropriate to identify the major problems facing the community, in order tohelpindicate the types of projects and priorities that need to be considered for future catchment development. The surveyedhouseholds were thus asked to state the major problems affecting their families, including farming difficulties and those affecting their community.

10.1 Main problems affecting the household

The major problems affectinghouseholds and their severity (as reflected by the frequency of their being mentioned) are shown in Table 22.

Table 22: Major problems faced by the surveyed households

Major household problems	Long Napir		KpgBahagia	
	Freq.	%	Freq.	%
Lack of manpower to farm and do other activities	**35**	**87**	**20**	**71**
Lack of capital to start any enterprise	**37**	**92**	**26**	**93**
Lack of opportunities to earn cash income	**37**	**92**	**24**	**86**
Limited land suitable for farming	0	0	1	4
Family members always get sick	2	5	2	8

Both the Kelabit and Penan households in the area are beset with three major problems: lack of capital to start any enterprise; lack of manpower; and lack of opportunities to earn cash. These problems reflect of the prevailing socio-economic issues and the communities' isolation from mainstream development.

The Kelabit families in Long Napir greatly felt the inadequacy or lack of manpower due to their aging population coupled with the out-migration of their capable members.Thesurveyed households considered other problem such asKelabitfamily members always getting sick and limited land suitable for farming for the Penanasrelativelyless important.

10.2 Main farming problems

The two communities appeared to have different views on farming problems. TheKelabit, who have practised shifting cultivation ever since they settled in the present area, considered pest and disease attacks as their most critical problem. About 70% of the Kelabit households as compared to only 29% of the Penan households reported problemsinvolvingattackbyinsects, rodents and fungus, as well asdestruction by wild animals. Wild animals such as monkeys and wild boar are reported to cause devastating cropdestructionif not controlled, particularly in the case ofisolatedfarms located deep in the jungle.

The lack of capital and limited land suitable for farming are the other major critical problems facing both the Kelabit and Penan farmers. A lack of capital to undertake any activities is a universal problem in both urban and rural areas but the problem is particularly critical among the local communities as financial institutions are not available in the remote areas while opportunities to earn cash are limited. The same proportion (68%) in both communities reported such problems. The topography of much of the area (steep terrain with poor skeletal soils) is the underlying cause of lack of suitable farming land. Lack of manpower to farm is also another problem both communitiesface.Kelabit families normally address this problembyengagingPenan as farmhands. However, with increasing wages, 53% of the Kelabit households mentioned that hired labour is getting more expensive now.

The Penan,being less involved in farming and having settled much later than the Kelabit, perceived their farming problems differently. Their three major farming problems,in order of importance, are lack of capital, limited land suitable for farming and insufficientmanpower. Lack of capital was reported by 88%,limited land for farming by 79%and insufficient manpower by 61% of the households (Table 24).

Table 23: Major farming problems faced by the surveyed households

Major farming problems	Long Napir		KpgBahagia	
	Freq.	%	Freq.	%
Lack of capital to start any enterprise	**27**	**68**	**23**	**88**
Insufficient manpower	19	48	17	**61**
Suitable land limited for farming	**27**	**68**	**22**	**79**
Pest & disease attacks	**28**	**70**	8	29
Hired labour expensive	**21**	**53**	0	0

10.3 Main community problems

Numerous major problems affected both communities, with differences between the two communities in terms of magnitude of the problems. The survey results indicated the three major problems facing both communities in the catchment to be distance from town, river pollution and scarcity of wild animals and fish(Table 24)

Table 24: Major problems faced by the local communities

Main Community Problems	Long Napir		KpgBahagia	
	Freq.	%	Freq.	%
Too far from town	**38**	**95**	**23**	**82**
Rivers getting polluted	**36**	**90**	**25**	**89**
Wild animals and fish getting scarce	**38**	**95**	**23**	**82**
No electricity	7	18	9	32
No water supply	0	0	2	7
No road link	1	2	1	4
No clinic nearby	4	10	5	18
Insufficient land for farming	1	2	1	4

The overwhelming majority (95%) of the Kelabit households mentioned the main problems facing their community as being too far from town and wild animals and fishes getting scarce. The Penan community also facedthe same problems as 82% to 89% of their households cited these two problemsrespectively(Table 24). Ninety percent (90%) of the Kelabit also mentioned river pollution. Scarcity of wildlife and fish and river pollution are closely related and largely aresult of logging within the catchment.

10.4 Felt needs of the community

The felt needs of the communities in the catchment are as follows:

(1) Better road and transportation system
(2) Basic facilities and social amenities
(3) Creation of employment opportunities and implementation of more income generating projects, and
(4) Forest conservation projects

An all-weather road to connect the communities to the nearest town, Limbang, is a basic need for communities who are currently experiencing the hardships of being isolated in a remote catchment.

Improvement of road access to the two kampongs is another needin order to reduce transportation problems. The communities currently dependtotally on existing logging roads passing their areas.The logging companies operating in the areashave fulfilled their social obligations to the communities by constructing and maintaining feeder roads. However, the Penan in KpgBahagiain particular really need a roadtoconnect their village to Long Napir to replace the small concrete path that the government constructed a long time ago. The construction of better roads to thevillages would, in the long run, improve their socio-economic status as apart from permitting better exposed to the market economy, community members would have greater access to more modern facilities in the town centre.

Basic services and facilities, such as atreated water supply, electricity, telecommunication and internet services and a clinic, as well as social amenities and recreational facilities for the children, need to be provided in order to improve the communities' standard of living.Surprisingly, none of the households mentioned a need for more and better equipped schools and a clinicthatwould definitely benefit the local community. With increasing pollution of most of their rivers, the communities' need for a treated water supply will become critical in the near future.The same applies to their need for areliable kampong power supply to meet need and their rising expectations for a better standard of living. Some households have their own television sets and other electrical appliances.

There is a need to create employment opportunities, including income-generating projects, such agricultural and forestry projects as well as to promote handicrafts and ecotourism in view of the high incidence of poverty among the local community.

Local communities have been depending on wild game and river fishfrom the surrounding forests for their food supply and to supplement their cash income. Over the past 10 years wild animals and fish are getting harder to catch as a result of increasing hunting and fishingintensity while the rivers are increasingly polluted –a trendlikely to continue. Any programs to help minimise the communities' dependenceon the forests for their food and supplementary income, would be beneficial. Alternative approaches such as the development of integrated agroforestry projects could be worked out for the community in order to diversify their economy as well as, to increase their income.

All these problems and felt needs of the survey households reflected the prevailing socio-economic situation in the area, and should be considered in any management plan for both immediate and long-term development of the catchment area.

11 RECOMMENDATIONS

The following initiatives are proposed to beincorporated in management and conservation measures for Sg Medihit water catchment.

11.1 Establish a Community-based Sustainable Forest Management Committee

A mechanism is neededto manage and conserve the remote watershed and its forests, located far from public view in the interior of Ulu Limbang. The local communities,beingclosest to the forest, can play an active role as foreststewards. Acommunity-level **Sustainable Forest /Watershed Management Committee** may need to be established with the support of Forest Department Sarawakto:

- monitor the area and carry out enforcement
- undertake the continuous process of community development and consultation
- coordinate and implement various development programs and initiatives for the local communities including educational and conservation programs.

Regular consultation and community dialogues will help project management to get feedback on issues and problems relating to development programsimplementation. Most importantly, the major stakeholders will be brought together in the process of collective decision-making and innovative problem-solving and this will help establish good rapport with the locals and encouragecommunity participation in the area's sustainable forestmanagement and conservation.

11.2 Awareness-raising measures

Raising the level of awareness of the importance of forests and environment will empower local community members to identify and address the related environmental issues locally.

11.3 Alternative options and opportunities to earn a living

Government agencies should explore how to providethe local communities with new options to earn a living. Training needs, as a means ofempowerment,will need to be assessed.Trainingis needed in enterprise and skills development for agriculture, homestay establishment and running, handicraft-making and marketing tourist guideskillsas well as forest and environmental management.

11.3.1 Niche medicinal and herbal plants production

The development and production of niche agricultural and forestry products, including high value medicinal and herbal plants, is an initiative to make the most of the area's forest and biodiversityassets.A wealth of indigenous knowledge on local plants is available especially among the Kelabit and Penancommunityelders. The project could assist in the collection and documentation of these resources with a view to generating interests in their conservation and to preserve the ethnobotanical knowledge for future generations. Niche products' formulation and production could be explored, initially for personal consumption and the local market, and later for commercialization.Thelocal forests could provide a suitable habitat to raise plants to support a herbal industry.

11.3.2 Planting local treesincluding indigenous fruit trees

Useful local fruit or timbers trees in the surroundingforest need to be documented and their potential explored. Such trees could be planted, either individually or on communal basis,in integrated agroforestry projects toreduce pressures on the nearby forest,benefit the communitiesand help rehabilitate degraded secondary forest. Some indigenous fruits species may help local players earn cash if they can enter the thriving market for local fruits in Limbang and Brunei.

11.3.3 Development of freshwater fisheries

Freshwater fish are one of the major sources of protein and supplementary cash income for the local community. Indigenous and high value fish speciessuch asikansemah and ikantenggadakare getting harder to catch although they are still available in certain rivers. The villagers need assistance to develop freshwater fisheries to help provide them with good incomes and a constant proteinsupply. This kind of project can be done both by individual households and on a community basis depending on their interests and capabilities.

The ideas of communal ownership and working together still prevail among the local communities. As such, a fisheries project under the Tagangsystem(under which certain river sections are adopted as conservation areas for fishery and fishing is only allowed at certain intervals) could be explored. The community themselves could thenmanagethe rivers on a cooperative and trust basis. A number of the households proposed the idea and the Inland Fisheries Branch, Department of Agriculture can assist in implementation, as they have in many areas in Sarawak. If successful, the project could be further developed as atouristattraction.

11.3.4 Ecotourism development

The communities have a rich histories and culture and the area beautiful scenery and trails suitable for trekking. Great opportunities for ecotourism activities such as trekkingandhomestays exist.TheKelabit are talented in their cultural dances and sape music, which can be atouristattraction. All theecotourismactivities can be packaged with homestays and productsto benefits the community. Such related activities can provide local employment and asource of cash, especially to the older family members.

11.3.5 The handicraft industry

BoththeKelabit and Penanladies have talents and skills in beadwork and weaving. The most popular handicrafts they currently produce are woven mats and basketsmade of plastic strapping tape. These they cansellto tourists and visitors to the village. Even with limited telecommunications access Penan ladies now earn cash marketing their handicrafts in Limbang and Brunei through the help of some caring individuals. However, there is a need for proper organization and training in order to ensure that their products aremeet current market demands. Start-up capital would benefit some individuals to enable them to buy materials from Limbang.

Figure 16: Kelabit Ladies with their traditional costumes and beads

Figure 17:Penan lady and Penan handicrafts

12 CONCLUSION

The only prior study on the two local communities'demographics and socio-economic situationwas that of Urud (2009) in a study made under the ITTO Pre-Project PPD 135/07 Rev.1(F) Community-based forest management of Sungai Medihit watershed.

The two communities living within SgMedihit Watershed havedepended on the land and forests therefor their livelihood for centuries.Theyhave a strong attachment to,and a long tradition of conservation strategies for the forests. Theyappreciate the values of the forests and realize their great potential tobenefit the community. They arethusreceptive to the idea of conservation of the watershed and supportive of the project and government's effort in helping them conserve and manage the area sustainably. As such, acrucialprojectstrategywill be to encourage greater local communityparticipationin actual watershed management. Sustainable development and management of the forest conservation areas depend very much on the cooperation and active participation of the nearby communities.

The project should also aim to provide the local communities with skills and opportunities to improve their livelihood through new initiatives as recommended above to help meettheirbasic socio-economic needs and aspirations. This will help reduce their dependence on the forest and its resourcesandensure this rich heritage of natural ecosystems is conserved and wisely managed and will remain a haven for rich plant and

animal life and continue to provide valuable ecological functions for the present and future generations.

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