

A GEOGRAPHICAL ANALYSIS ON THE PRIMARY ECONOMIC ACTIVITIES IN BANMAW TOWNSHIP

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Abstract

The title of this research paper is "A Geographical Analysis on the Primary Economic Activities in Banmaw Township". Banmaw Township lies on the eastern and the western banks of the Ayeyarwady River between Myikyina and Shwegu Townships and on the south eastern most part of the Kachin State. This Township is composed of Banmaw Town proper together with (45) village tracts. It is a region with better agricultural activities and means of transportation than the surrounding regions. The northern and the north western areas of township are covered with the dense forests on the high mountains. These mountains are very important sources for mining and timber extraction. The main aim of this research is to analyze the spatio-temporal variations of primary economic activities especially agriculture, animal husbandry, fishing forestry and mining. Physical and social bases of the study area were studied as the supporting factors for the primary economic activities. Dr. Bhatia's Location Quotient Method was applied to analyze the concentration of agricultural lands in the study area. To analyze the primary sector, appropriate statistical methods were also used in this research. As the majority of people live in the rural areas, agriculture has been the main primary economic activity of the study area. This paper can partially provide the planning of the development of primary economic activities in Banmaw Township as well as the other townships in Kachin State.

Keywords: primary economic activity, Location Quotient, spatio-temporal

Introduction

The primary sector is the economy extracts or harvests products from the earth. The primary sector includes the production of raw material and basic foods. The activities associated with the primary sector include agriculture (both subsistence and commercial), mining, forestry, farming, grazing, hunting and gathering, fishing, and quarrying. The packaging and processing of the raw material associated with this sector is also considered to be part of this sector.

Banmaw is a township in which economic activities are mainly relying on agriculture. Therefore, the agricultural activities play a vital role in this study area. Depending upon the physical factors, land uses of the township differ from place to place. The raw commodities are obtained from lands, forests and mines. These raw commodities have to be passed through the manufacturing or producing stage to acquire finished product.

Study Area

Banmaw Township is located in the Kachin State. It is situated between the latitudes of 23° 54' 8" North and 24° 42' 23" North and between the longitudes of 96° 54' 36' East and 97° 21' East. The total area of the township is 759.01 square miles (485,766 acres). This Township lies on the eastern bank of the Ayeyarwady River. The topography of this township can be divided into the Low Plain Region and the Highland Region. The Low Plain Region consists of regions less than 1,000 feet (305 m) above sea level. The average height of the hill ranges is about

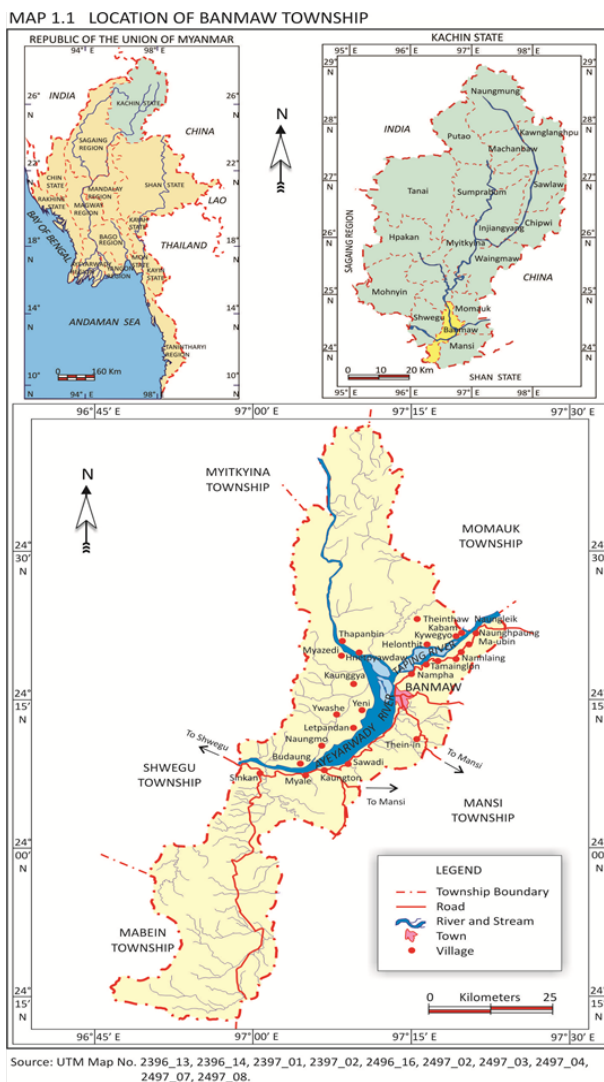
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2,690 feet (821 m) above sea level. As Banmaw Township lies north of the Tropic of Cancer, it lies within the Temperate Zone. It suffers the Warm Temperate Humid Subtropical Climate (Cwa) according to Koppen's Climatic classification. The northern and north western areas of township are covered by higher mountains with dense forests.



Aim and Objectives

The main aim of this research is to analyze the spatio-temporal variations of primary economic activities which are essential for the economic development of Banmaw Township.

The objectives of this paper are as follows:

- To classify the primary activities practiced in the study area.
- To identify the spatial distribution of primary activities in the study area.
- To evaluate the temporal changes of production in primary activities.

Data Collection and Methods

The primary data are collected by interviewing with the local people. The secondary data are collected from the Government offices such as Township Peace and Development Council, Department of Agriculture, Land Management and Statistics, and Immigration and Man Power Departments etc.

Analysis on the Primary Economic Activities in Banmaw Township

Banmaw Township is one of six townships in Banmaw District, Kachin State. The Ayeyarwady River passing through the middle part of the township flows from north to south direction within the study area. The primary economic activities play a major role in the economic functions of the township. The types of the primary economic activities are agriculture, animal husbandry, forestry and mining,

Agriculture

Agriculture has been the main occupation of the economy of Banmaw Township. There are differences in the agricultural lands depending upon the physical factors. The agricultural land can be classified into five types as 'Le' land (paddy land), "Ya" land (dry crop land), "Kaing-kyun" land (island and riparian land), "Garden" land and "Taungya" land.

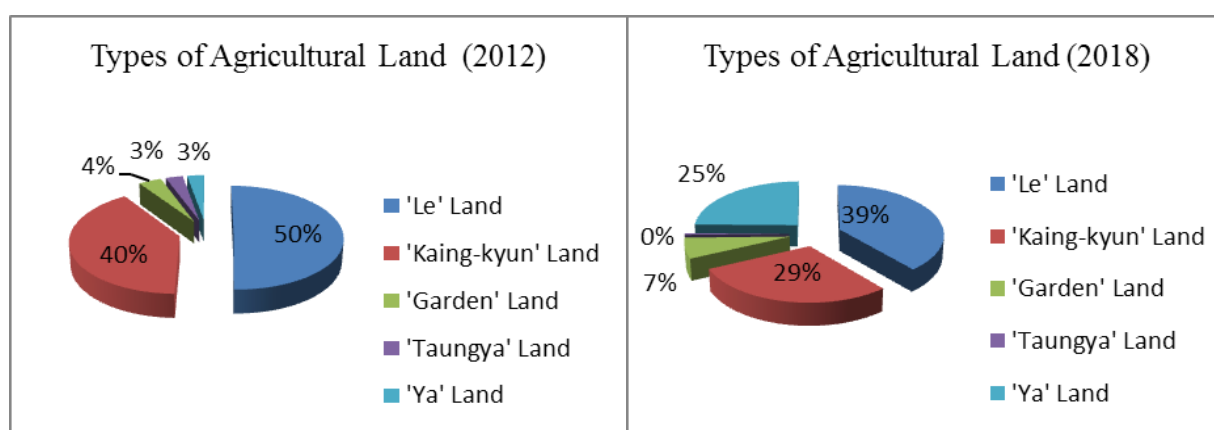
Temporal Changes of Agricultural Land

In studying the agricultural land of Banmaw Township during the year 2012 to 2018, there were changes in types of agricultural land (table 1 and figure 1). By comparing the two periods, it is found that except Taungya land, all the remaining agricultural lands were increased for the extension of agricultural lands.

Table 1 Temporal Changes of Types of Agriculture in Banmaw Township

Sr.	Types of Agricultural Land	2012 Hectares	%	2018 (Hectares)	%	Change
1	'Le' Land	6989	50.33	8,019	39.10	1030
2	'Kaing-kyun' Land	5590	40.26	5990	29.00	400
3	'Garden' Land	527	3.80	1387	6.70	860
4	'Taungya' Land	395	2.84	107	0.50	288
5	'Ya' Land	386	2.77	5109	24.70	4723
	Total	13887	100.00	20612	100.00	

Source: Land Management and Statistics in Banmaw.



Source: Based on table (1)

Figure 1 Temporal Changes of Types of Agriculture in Banmaw Township

Concentration of Agricultural Land

The spatial variations in the degree of concentration in agricultural land use are found to be the result of the differential interaction between various factors such as physiographic, climatic, hydrological, socio-economic, etc. of an area.

Agricultural land use concentration of each village tract is calculated by Dr. Bhatia's Method. In order to determine the regional concentration of land use and index (the location quotient) is used. Agricultural land use concentration is described by the current cultivated area of the village tracts in Banmaw Township. The agricultural land used concentration index of wards and each village tract is classified into three grades as high, medium and low. According to the table (2) the concentration of agricultural land will be calculated by Location Quotient Method. The agricultural land are analyzed in this parts >4.24 =High, Medium 0.82 - 4.24 , Low <0.82 .

$$LQ = \frac{X1/X}{Y1/Y}$$

X1 = Single amount in an area
X = Total amount in an area
Y1 = Township amount in area
Y = Total amount in an area

Map (1) Concentration of Agricultural Land in Banmaw Township

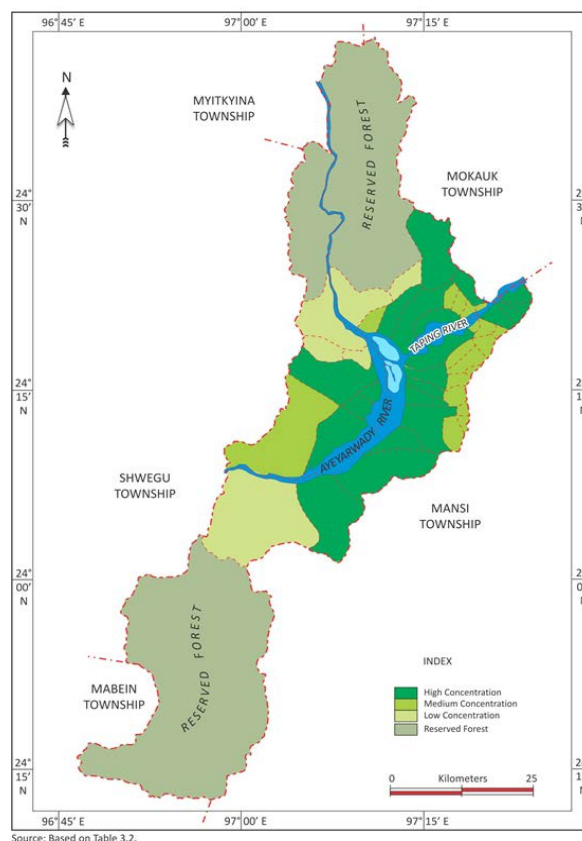


Table 2 Concentration of Agricultural Land Use in Banmaw Township (2018)

Sr.	Village Tract	X value	Level of Concentration
1	Naung lite	1.50	Medium
2	Manye	2.73	Medium
3	Ma u bin	3.23	Medium
4	Ma lular	3.19	Medium
5	Nanthaling	2.02	Medium
6	Khuli	2.88	Medium
7	Mophein	1.00	Medium
8	Tamainglone	7.14	High
9	Chaungwa	7.27	High
10	Kywe-Cho	1.96	Medium
11	Hsaing Kin	4.94	High
12	New Helone	2.88	Medium
13	Old Helone	1.06	Medium
14	Teintaw	0.88	Medium
15	Thaphanbin	0.02	Low
16	Ngetpyawdaw	2.98	Medium
17	Sintkin	1.20	Medium
18	Myasedi	0.19	Low
19	Papaung	2.16	Medium
20	Kyungyi	2.22	Medium
21	Maingka	4.43	High
22	Manbin	2.97	Medium
23	Konekha	6.00	High
24	Manmalin	0.50	Low
25	Kaungsient	3.49	Medium
26	Yene	2.83	Medium
27	Kantha	1.83	Medium
28	Letpandan	4.99	High
29	Naungmo	1.58	Medium
30	Sinkan	0.16	Low
31	Kaungtone	0.95	Medium
32	Sarwati	0.82	Medium
33	NyaungbinThar	1.30	Medium
34	Kangyi Kabani	3.54	Medium
35	Thainlin	1.99	Medium
36	Manyut	2.39	Medium
37	Khokyin	3.73	Medium
38	Manpha	2.05	Medium
39	Sihe	2.46	Medium
40	Si in	2.38	Medium
41	Mankhun	4.69	High
42	Shwepyitha	1.22	Medium
43	Hante	1.20	Medium
44	Konemahat	3.73	Medium
45	Aungtha	0.18	Low
46	Ward	3.61	Low
		116.47	
	Mean	2.53	

Sources: Calculated by Researcher

In analyzing the type of agricultural land use pattern in Banmaw Township based on table (2) the high concentration of the agricultural land use pattern was found in the village tracts namely: Tamainglone, Chaungwa, Hsaingkin, Khonekha Maingka, Letpandan and Mankhun with the ranges of index above 4.24. These village tracts are situated in temperate zone of Myanmar, heavy rainfall, moderate temperature and various kinds of natural vegetation. The rainfall is sufficient for agricultural activities but sometimes irrigation of water is needed. In order to irrigate water for the agricultural land within Banmaw Township, water from the Ayeyarwady River, Taping River, Mole Chaung, Theinlin Chaung and Sinkan Chaung is tapped and is irrigated by pump set.

The remaining (33) village tracts are medium concentration of agricultural land with the ranges of index between 0.82-4.24. These village tracts were well supplied where water from the Ayeyarwady River, Taping River and Theinlin Chaung. As well as, the use of various machines was popular among the farmers. In Banmaw Township, the low concentration of agricultural land is found in Thaphanbin, Mammalin, Myasadi, Sankan and Aungtha village tracts. These village tracts are situated in northern and western part of the township. It is noted that high terrain is major determinant for plough land by machines. These village tracts are located at the end of water source also had low level of concentration index.

It can be clearly seen that the central and western portions of the township can be supplied with water. Thus, the high and medium concentrations of agricultural land use can be found in these parts of township, whereas, the northern and southern parts have less concentration of agricultural land areas.

Temporal Changes of Cropping Pattern

The main economic activity of Banmaw Township is agricultural activity where diversified varieties of crops are produced. Within Banmaw Township, the main crops cultivated are paddy, maize, soya bean, green gram, groundnut, sesame, mustard, sugarcane, tobacco and other crops.

In 2012 the total sown area of cultivated crops within Banmaw Township was 13,887 hectares (34,315 acres). Among the crops grown, paddy was the most sown crop in Banmaw Township. The Banmaw Plain and the Taping River valley are major cultivated areas of paddy in Banmaw Township. The sown area of paddy was 6,399 hectares (15,812 acres) which amounted to 46.00 percent of the total sown area of crop within Banmaw Township. The second largest crop sown was groundnut occupying the sown area of 3,629 hectares (8,967 acres) which amounted to 26.13 percent of the total sown area of crop within Banmaw Township. Groundnut was cultivated on "Ya" land and "Kaing-kyun" land in rainy season and winter season respectively. The third largest crop grown was sugarcane occupying the sown area of 1,504 hectares (3,717 acres) which amounted to 10.83 percent of the total sown area of crop within Banmaw Township. Sugarcane was cultivated mainly in Manmalin, Kaungtone, Nyaungbintha and Sarwati village tracts.

The sown area of tobacco was 635 hectares (1,569 acres) or 4.57 percent of the total sown area of crops in Banmaw Township within the year 2012. Tobacco was mostly cultivated on "Kaing-kyun" land. In 2012, the sown area of mustard was 587 hectares (1,450 acres) which amounted to 4.23 percent of the total sown area of crops in Banmaw Township. In Banmaw Township, maize was grown for both purposes of human and animal food. The sown area of

maize was 484 hectares (1,195 acres) which amounted to 3.48 percent of the total sown area of crops in Banmaw Township. Maize was cultivated in “Ya” lands. The main types of pulses grown in Banmaw Township were soya bean and green gram. The sown area of soya bean and green gram were 169 hectares (417 acres) (1.21 percent) and 28 hectares (70 acres) (0.20 percent) respectively. Soya bean and green gram were cultivated on “Ya” lands. The sown area of sesame was 146 hectares (361 acres) which amounted to 1.05 percent of the total sown area of crops in Banmaw Township. The other crops occupied the sown area of 306 hectares (757 acres) which accounted for 2.20 percent of the total sown area of crops in Banmaw Township.

In comparing the cropping pattern of Banmaw Township, during 7-year period from 2012 to 2018, paddy was changed from sown area of crops within Banmaw Township. Groundnut also was changed from the second place in the sown area of crops within Banmaw Township. However, sugarcane changed from the third place in 2012 to fourth place in 2018. Tobaccos also changed from four places in 2012 to seventh place in 2018. Nevertheless mustard was changed from fifth rank from 2012 to 2018. As maize sown area increased by 976 hectares (2,411 acres) from 2012 to 2018, maize changed its rank from sixth place to third place. Soya bean changed its rank from seventh place in 2012 to sixth place in 2018. Green gram was changed from ninth place in sown area of crops during 7-year period from 2012 to 2018. The temporal changes of cropping pattern in Banmaw Township during 7-year period from 2012 to 2018 are shown in table (3).

Table 3 Temporal Changes of Cropping Pattern in Banmaw Township (2012 & 2018)

Crop	2012		2018		Changed
	Hectares	Percent	Hectares	Percent	
Paddy	6,399	46.00	8,719	42.32	2,320
Maize	484	3.48	1,459	7.07	975
Soya Bean	169	1.21	262	1.27	93
Green gram	28	0.20	64	0.31	36
Groundnut	3,629	26.13	4,235	20.54	606
Sesame	146	1.05	751	3.64	605
Mustard	587	4.23	1,149	5.57	562
Sugarcane	1,504	10.83	1,158	5.62	346
Tobacco	635	4.57	468	2.27	167
Others	306	2.20	2,347	11.38	2,041
Total	13,887	100	20612	100	7,751

Source: Agricultural Land Management and statistics, Banmaw

Animal Husbandry

Animal husbandry, an important type of primary economic activity has long been contributed to the development of local economy. In Banmaw Township animal husbandry is carried on for draught animals, for meat, to eat for transportation and communication. In this township, the animals commonly reared are chickens, buffaloes, oxen, goats, pigs, ducks and horses. The development of livestock breeding on this area is compared for two periods (2012 and 2018) and it is shown in table (4). According to the table, major types of animal are reared in this area and two type of chicken (for meat and for egg) are the largest in the number of head.

Pigs are reared for pork. In 2018, Banmaw Township (155,360) pigs were reared. Buffaloes are mainly reared as draught animals for the agricultural industries. During 2018, in Banmaw Township there were (602,074) dairy buffaloes and (110,561) buffaloes for draught.

Oxen are reared as draught animal to work in the agricultural industries. They are reared for meat also. During 2018 there were (1,047,690) dairy cows and (89,684) draught oxen. Cows are also reared for milk and meat.

According to the table (4), it can be found that animal husbandry in this area has many opportunities to be developed in local economy. Among the animal husbandry rearing of chicken, pigs and cows are more favorable for the development of local economy especially due to the given opportunities of climate, topography and the related pasturage. If the systematic management could be practiced in animal husbandry, it may develop and it will contribute to the development of the local economy to a greater extent.

Table 4 Animal Husbandry of Banmaw Township (2012 & 2018)

Sr.	Particular	2012	2018	Remark
1	Broiler	51,154	205,632	Private
2	Egg laying Hens	16,597	7,365,799	Company
3	Draught buffalo	12,396	712,635	Private
4	Draught Oxen	10,701	89,684	Private
5	Pig	9,590	155,360	Private
6	Muscovy Ducks	1,390	394,253	Private
7	Ducks	1,137	176	Private
8	Draught cow	997	1047,690	Private
9	Sheep/Goat	468	117	Private
10	Geese	309	219	Private
11	Horse	222	839	Private

Source: Animal Husbandry and Veterinary Department Banmaw

Fishery

Since 1991, the Fishery Department was opened in the township of Banmaw. In 2018, Banmaw has 202 private owned fishing ponds in Banmaw Township. The area of that pond is 68.25 hectares (168.65 acres). In Banmaw Township, Kyun Myit Yoe is situated in the Ayeyarwady River is the largest one and the fishing pond near Aungtha village is the largest pond. The fishes which are reared Nga myitchin, Myetsa, *Tillapia* and Ngwe Yaung fish.

Forestry

Forest is one of the sources of natural environment from which man can extract edible food supplies, fuel and construction or building materials. Moreover forests help in the operations regarding soil conservation, underground water, to control climate change. In Banmaw Township, the total forest land area is 116,429 hectares (287,702 acres) and it is 59.23 percent of the area of township. With regard to the forest sector it can be divided as follows.

(a) Reserved Forest

(b) Unclassed Forest

Reserved Forest

In Banmaw Township, there are 12 reserved forests. The total area of the reserved forest is 16,400 hectares (40,507 acres) and it covers 13.69 percent of the forestland area of the township. The separate reserved forest area of the Kachin State is 574,413 hectares (1,419,

405 acres) and 4.69 percent of the total forest reserved area of the Kachin State is found in Banmaw Township. Teak (*Tectona gaudis*), Pyinkado (*Xylia dolabriformis*) and Ingyin (*Pentacme suavis*) are found in the reserved forest. The reserved forests within Banmaw Township are shown Table (6).

Un-classed Forest

The area of unclassified forest with Banmaw Township was 41,598 hectares (102,790 acres) and 76.87 percent of the total forest lands of the whole township. The unclassified forests are mostly found in the northern part of the township. Within the unclassified forests are found Pyinkado (*Xylia dolabriformis*), Ingyin (*Pentacmes suavis*), Htauk Kyan (*Terminalia tomentosa*), Padauk (*Pterocarpus macrocarpus*) and varieties of bamboo. From unclassified forests forest are firewood and bamboo are extracted. But due to illegal cutting and felling of trees, depletion of forest occurs.

Table 5 Unclassed Forest of Banmaw Township (2018)

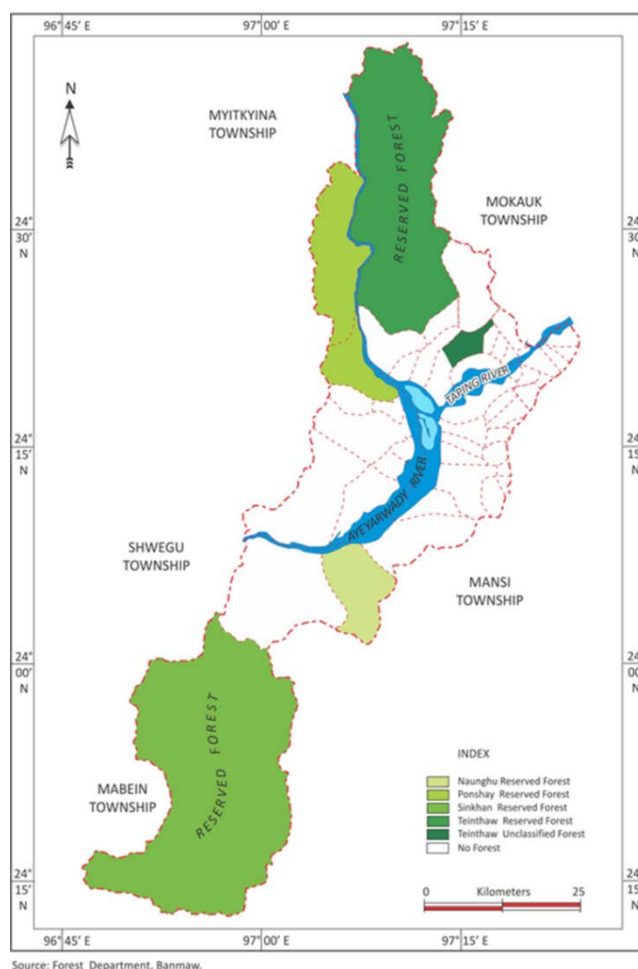
Sr.	Name of Unclassed Forest	Areas in hectares	Percent
1	Teinthaw unclassified forest	23,755	57.10
2	Sinkan unclassified forest	11,271	27.10
3	Ponshay unclassified forest	6,572	15.80
	Total	41,598	100.00

Source: Forest Department

Table 6 Reserved Forests of Banmaw Township (2018)

Sr.	Name of Reserved Forest	Plot No	Areas in hectares	Percent
1	Moehein Reserved	15	2978	18.50
2	Nanpha and Extension	12	2624	16.00
3	Ponshay	9	2031	12.38
4	Teinthaw Reserved Forest	-	1709	10.42
5	Zinbon Reserved Forest	5	1612	9.83
6	Naunghu Reserved Forest	7	1454	8.87
7	Simaw Reserved Forest	7	1350	8.23
8	Pungyaung Reserved Forest	5	976	5.95
9	Moist Reserved Forest (extension 1)	3	719	4.38
10	Munsin Reserved Forest	6	679	4.14
11	Sinkan	15	141	0.86
12	Moist Reserved Forest (extension 2)	-	127	0.77
	Total		16,400	100.00

Source: Forest Department of Banmaw

Map (2) Forests of Banmaw Township (2018)

Extraction of Timber and Other Forest Products

The timber and other forest products extraction are the second largest economic activity net to agriculture. In extraction of forest products in Banmaw Township, teak, hard wood and extraction of the other forest products are found. The extraction of teak and hardwood are shown in table (7). The timbers are extracted from Teinthaw reserved Forest and Ponshay Reserved Forest, special extraction of hardwood is carried on by the Kachin Independence Organization. Other forest products are fire wood, charcoal, bamboo, cane, hemp, resin, honey, dani (thetke) for matting the roofs, bee wax bark of ngu, cinnamon, liquorice, tazinthe, cardamom and dried mushroom.

Mining

Gold in the Banmaw Township is found in the granitic igneous rock layers exposed in hill slopes and Taping River. Gold of the Banmaw Township is being extracted by the nine companies. In 2012, the township has produced totally 129 Kyat 37 Pe 20 Ywe of gold and in 2018, 273 Kyat 63 Pe, 29 Ywe of gold.

According to the table (8), gold production is found and it significantly increased from (2012 and 2018) year and year. Gold extracted from nine companies has to pay tax to the

government. The regions which produce gold within Banmaw Township are shown table (8). There are nine companies in Sinkan, Myasadi, Thahpanbin, Mingkar, Kyaunggyi, Moesein kyaung villages.

Table 8 Gold Production Companies of Banmaw Township (2012 & 2018)

Sr.	Name	2012			2018		
		Kyat	Pe	Ywe	Kyat	Pe	Ywe
1	Htoo Ko Ko	22	13	6.5	68	9	2
2	Thein Than Thu	-	-	-	11	6	7
3	Shwe Sè Taw Wan	5	11	3	-	-	-
4	Htat Kaung Kyaw	60	0	3	80	0	1
5	Shwe Ta Pain	22	13	6.5	2	13	5.5
6	Northern Taw Wun Mye	20	0	1	17	2	2.5
7	Shwe Thapyay	-	-	-	5	11	3.5
8	Northern Thayaphyu	-	-	-	22	13	6.5
9	Khant Nyar	-	-	-	68	9	1
	Total	129	37	20	273	63	29

Source: Metal Department, Banmaw

Table 7 Extraction of Other Forest Productions of Banmaw Township (2012 to 2018)

Year	Forest Productions												
	Teak	Hardwood	Firewood	Charcoal	Bamboo	Cane	Resin	Hemp	Indwe	Honey	Bee wax	Deni thetke	Mathin
2012	53.61	5.15	4000	1000	2000	1325	32500	75	15000	450	2436	40	400
2013	0	0	3400	1900	1500	767	30000	75	10000	500	20	50	400
2014	176.28	0	5930	1700	1550	720	30500	75	10250	500	25	50	2700
2015	0	0	5000	1700	1600	750	31000	100	10000	500	25	50	0
2016	18.56	16.01	5000	1700	1650	640	31000	100	10000	500	25	50	0
2017	0	0	5250	1700	1400	585	20000	100	9750	500	25	50	0
2018	257.98	58.06	2150	768.25	421.8	50	20000	100	0	500	25	0	0

Source: Forest Department of Banmaw

Suggestion

In accordance with being an agricultural township, 86% of the total population of Banmaw Township has to rely on agricultural activities. According to this research, it is known that the township is insufficient in rice-production for local consumption. As the climate is unfavorable for paddy cultivation due to scarcity of rain, some suitable irrigation means should be created with the aids of either the government or other private entrepreneurs including companies, by signing acceptable agreement. Moreover, effective irrigating systems that can reduce the loss of irrigated water, high-yield strain, and appropriate technology should be used in cultivation.

According to this analysis, although it is known that the township can produce edible oil seed crops two times the need of local consumption, sesame and sunflower cultivation should be raised to get more income.

Farmers should practice intensive cultivation to heighten the production of agricultural produces and thereby economic activities will be developed. Agricultural Department should forbid the shifting cultivation that causes the decrease in forested area. The forest department should manage environment especially natural vegetation in Banmaw Township.

Future Prospect

Future development of an area is totally dependent upon the present conducting enterprises, future development plan and better idea of authorities and local people consumed. The most of local the jobless people should be given in first priority. Micro-finance works and rural cooperative works may also enhance the development of primary activities. Due to the implementing of rural development and poverty alleviation schemes, the primary activities of Banmaw Township will become more developed in future.

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