STUDY ON ECONOMIC IMPORTANCE OF *Oryza sativa* L., *Vigna radiata* L., *Arachis hypogaea* L. IN SOUTHERN PART OF BAGO REGION

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Abstract

This research paper deals with the economic importance of some plants on *Oryza sativa* L. (Pyaut-Tun rice), *Vigna radiatus* L. (Pe-di-sein), *Arachis hypogaea* L. (Myae- pe), The research areas are Kamar-net, Oobo, Kaleed and Upper Zaingganaing Gyi villages in the southern part of Bago region from 2018 to 2019. The processing of these plants have been interviewed with participants (farmers) from study area and morphological characters of source plants, agronomy, production and their uses were also presented. The yield, cost, income and profit of the local growers were calculated and compared between the four villages. So, it was observed that such three genera and three species have different yields performance and production, income, costs and profits among them and they are especially for food and economic importance for people because of man's most outstanding need.

Keys words : *Oryza sativa* L, *Vigna radiatus* L, *Arachis hypogaea* L.Economic Importance

Introduction

Rice is an important export commodity in Myanmar (Grubben and Soetjipto,1996).The sown area of monsoon rice and summer rice in 1998-99 was 11.93 and2.30million acres respectively.(FAO, 2002). Groundnut is the most reliable of the oil seed crops in Myanmar.. Groundnut is marketed for two different purposes: (1) to be consumed as groundnut oil and (2) to be used as traditional snack (FAO, 2002).On the other hand, the country's pulses export volume is the highest among the ASEAN countries. Green gram and black gram are the major exported pulses. Green gram is grown both in central and lower Myanmar. The most productive districts in order of importance are Magway, Southren Yangon, Bago, Shwebo,Sagaing, pakokku, Magway (FAO, 2002). Although the economic important plants are essential for the socio-economic life of people resided in Bago and its surrounding areas, it does not have so far any systematic information concerning economic botany point of view. Therefore, the present study emphasizes on economic important plants in BagoTownship within the scope of economic botany. The aims and efforts of the present studied areto inform the role of plants and their products on socio-economic life of local people in studied area and to recommend the potential economic crops which can support the nation's economic development.

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SURVEY METHODOLOGY

In the point of methodology, two data collection techniques are included: the standardized questionnaire survey and in-depth, and case-study interviews. The first one is the quantification of the significant species of these areas and second, data verification and informant choice.

Results

In the studies area, plants are divided into two sections: Cereal(rice)and crops (pulses and oil crop), the morphological characters, agronomy, crop production, costs and profits etc. were also presented.

Scientific Name - *Oryza sativum* L.

Common Name -Rice, Paddy

Myamar Name - Saba

Family - Poaceae

Morphological characters

Annual grass, stem (culm)branching by tillers. Leaves alternate, apex acute, multicostate parallel venation; spikelet consists of 1-7 florets. Flowers sessile, arranged on a short rachilla, bracteates, the outer or the lower bract is lemma. The inner bract is the palea, floret bisexual, irregular, complete, zygomorphic, hypogynous; stamens 3, anthers dithecous and versatile, longitudinal dehiscing; ovary monocarpellary, unilocular, single ovule, basal placentation, the styles-bifid, the stigma feathery. Fruit a caryopsis, seed albuminous.

Agronomy

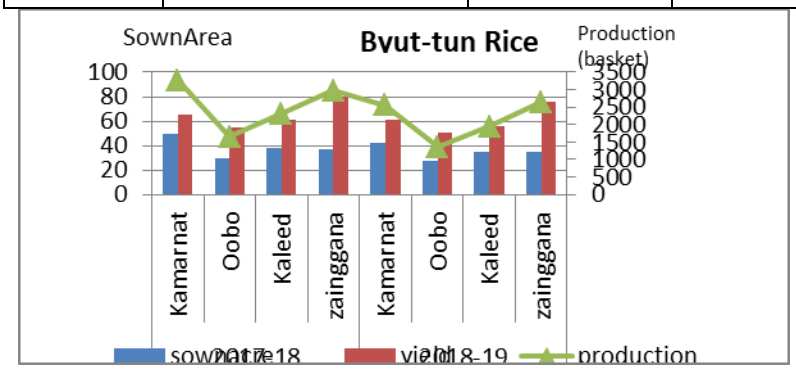
After the field has been flooded for 10 days, the land was plowed twice by power tiller thoroughly.. The cleaned seeds were imbibed in water for 24 hours. The germinated seeds that had 2 mm and above radicle length were used for nursery seed. Seeds beds constructed in the field and irrigated continuously, to a depth of one-two centimeter of water and the seedling were pulled out to transplant from the beds 25 days after sowing. Then 25 days old seedling of each variety was transplanted in straight rows with 3 seeds using per hill and 20 × 20 cm spacing. Apply fertilizer with the dose of 60-40-45 kg NPK/ha^{-1}. They are mainly caused by bacteria, viruses,or fungi. Pesticide (phenthoate 50 EC and READY 505 EC) was used.. Rice is cut by stem with a sickle, 10 cm below the panicle so as to leave straw in the field in amounts large enough to produce grating for cattle. The life span of rice Byut-tun is 120 days.

Production

The total production of paddy (Byut-Tun Saba)at four villages in Bago Township is 10208.75 (Baskets) from 155 acres in 2017-2018 and 8490.4 (Baskets)from139 acres in 2018-2019 . (Source :Settlement and Land Record Department of southernBago Division .(See in table (1,).The cost , income ,profit per acre is given in table (2)

Table (1) Data obtained from Cultivation and Production of Byut –tun rice in Bago Township

	Villages	Sownacre	Yield	Production
2017-18	Kamarnat	50	65.5	3275
	Oobo	30	55.2	1656
	Kaleed	38	60.75	2308.5
	Upper Zaingganaing Gyi	37	80.25	2969.25
	Total	**155**	**261.7**	**10208.75**
2018-19	Kamarnat	42	60.65	2547.3
	Oobo	27	50.3	1358.1
	Kaleed	35	55.3	1935.5
	Upper Zaingganaing Gyi	35	75.7	2649.5
	Total	**139**	**241.95**	**8490.4**



Fig(1) Sown Area, Yield and Production of Byut-tun rice from 2017 to 2019

Table 2) Data obtained dfrom Cultivation and Production of Byut-Tun in Bago Township (2018-2019)

No	Village	Cultivar	ited Acre	Yield per Acre	Cost per Acre	Price per Acre	Income per Acre	Proift per Acre	Total Yield	Total Cost	Total Income	Total Profit
1	Kamarnat	1	12	65	240,000	5,200	338000	98,000	780	2880000	4056000	1176000
		2	11	62	240,000	5,200	322400	82,400	682	2640000	3546400	906400
		3	9	60	230,000	5,200	312000	82,000	540	2070000	2808000	738000
		4	9	64	240,000	5,200	332800	92,800	576	2160000	2995200	835200
		5	8	65	240,000	5,200	338000	98,000	520	1920000	2704000	784000
	Total		49	316	1190000		1643200	453,200	3,098	11,670,000	16,109,600	4,439,600
	Average		9.8						63.2	238000	328640	90,640
2	Oobo	1	7	55	230,000	5,200	286000	56,000	385	1610000	2002000	392000
		2	6	50	200,000	5,200	260000	60,000	300	1200000	1560000	360000
		3	3	52	230,000	5,200	270400	40,400	156	690000	811200	121200
		4	4	55	230,000	5,200	286000	56,000	220	920000	1144000	224000
		5	7	53	230,000	5,200	275600	45,600	371	1610000	1929200	319200
	Total		27	265	1120000	26000	1378000	258000	1432	6030000	7446400	1416400
	Average		5.4						53	224000	275600	51600
3	Kaleed	1	5	60	250,000	5,200	312000	62,000	300	1250000	1560000	310000
		2	6	58	250,000	5,200	301600	51,600	348	1500000	1809600	309600
		3	7	57	250,000	5,200	296400	46,400	399	1750000	2074800	324800
		4	8	60	250,000	5,200	312000	62,000	480	2000000	2496000	496000
		5	5	55	245,000	5,200	286000	41,000	275	1225000	1430000	205000
	Total		31	290	1245000	26000	1508000	263000	1802	7725000	9370400	1645400
	Average		6.2						58	249000	301600	52600
4	Upper Zaingganaing Gyi	1	8	75	235,000	5,200	390000	155,000	600	1880000	3120000	1240000
		2	5	65	235,000	5,200	338000	103,000	325	1175000	1690000	515000
		3	6	67	235,000	5,200	348400	113,400	402	1410000	2090400	680400
		4	7	72	235,000	5,200	374400	139,400	504	1645000	2620800	975800
		5	8	75	235,000	5,200	390000	155,000	600	1880000	3120000	1240000
	Total		34	354	1175000	26000	1840800	665800	2431	7990000	12641200	4651200
	Average		6.8						70.8	235000	368160	133160

Table(2) Data obtained from Cultivation and Production of Byut –tun rice in Bago Township

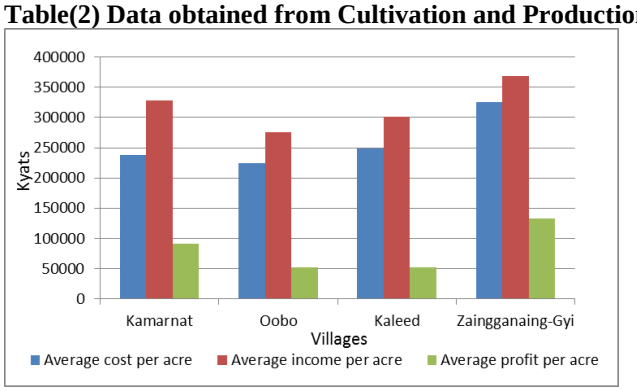


Fig.(2) Comparison of cost, income, profit per acre in four villages. (2018-2019)

Green- Gram

Source plant - *Vignaradiata* (L.)Wilezek.
Family - Fabaceae

Local name - Pe-de-sein

Morphological Characters

Annual, erect herbs, stem cylindrical, diffusely branched. Leaves alternate, pinnately, trifoliate, pubescent on both surfaces, leaflets ovate, stipules prominent. Flowers pale yellow, 10-20, crowded in axillary racemes, clustered near the top. Pods slender, Seeds globular, usually green, margin slightly concave.

Agronomy

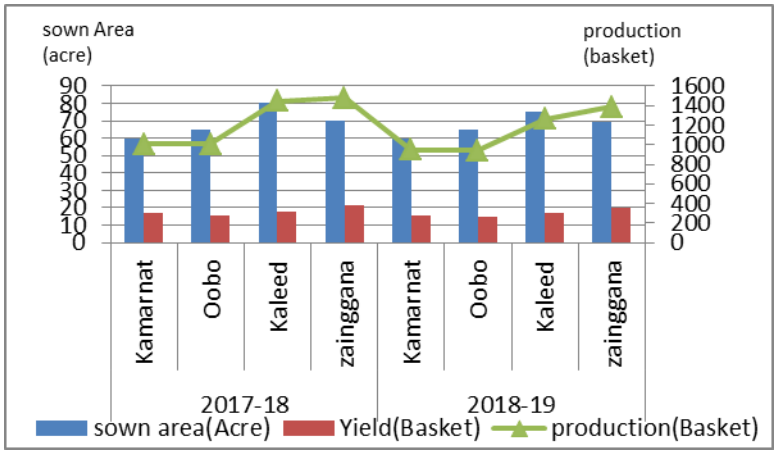
It is sown broadcast or in rows with a seed rate of 12-15lb per acre.It is sown with 12-18 inches row spacing and 4-6 inches between plants. The seed depth should be 1-2 inches. Apply fertilizers basally before sowing. 25kg N, 50 kg ρ and 50 kg κ/ha .The common pests of green gram are hairy caterpillar. It can be controlled by spraying with Fungicides Pick peas in the morning after the dew has dried and pods are ready for harvesting in about 75-140 days.

Production (Green –gram)

The total production of Green-gram (Pe–de–sein) in Bago Township 4941 (Baskets) from 275 acres in 2017 -2018 and 4539 .53 baskets from 269 acres in 2018 -2019. (Source : Settlement and Land Record Department of southern Bago Division.

Table (3) Data obtained from Cultivation and Production of Green-gram in Bago Township (2018-2019)

Year	Villages	Sown area (Acre)	Yield (Basket)	Production (Basket)
2017-18	Kamarnat	60	16.75	1005
	Oobo	65	15.5	1007.5
	Kaleed	80	18.1	1448
	Upper Zaingganaing Gyi	70	21.15	1480.5
	Total	**275**	**71.5**	**4941**
2018-19	Kamarnat	60	15.75	945
	Oobo	65	14.5	942.5
	Kaleed	75	16.85	1263.75
	Upper Zaingganaing Gyi	69	20.12	1388.28
	Total	**269**	**67.22**	**4539.53**



Fig(3) Sown Area, Yield and Production of Green-gram from 2017 to 2019.

Table(4)ata obtained from Cultivation and Production of Green-Gram in Bago Township (2018-2019)

No	Village	Cultivar	Cultivated Acre	Yield per Acre	Cost per Acre	Price per Acre	Income per Acre	Proift per Acre	Total Yield	Total Cost	Total Income	Total Profit
1	Kamarnat	1	12	9	250,000	42,000	378000	128,000	108	3000000	4536000	1536000
		2	11	10	255,000	42,000	420000	165,000	110	2805000	4620000	1815000
		3	9	11	260,000	42,000	462000	202,000	99	2340000	4158000	1818000
		4	9	10	270,000	42,000	420000	150,000	90	2430000	3780000	1350000
		5	8	9	245,000	42,000	378000	133,000	72	1960000	3024000	1064000
	Total		49	49	1280000	210000	2058000	778000	479	12535000	20118000	7583000
	Average		9.8						9.8	256000	411600	155600
2	Oobo	1	7	8	255,000	42,000	336000	81,000	56	1785000	2352000	567000
		2	6	9	250,000	42,000	378000	128,000	54	1500000	2268000	768000
		3	3	10	240,000	42,000	420000	180,000	30	720000	1260000	540000
		4	4	9	245,000	42,000	378000	133,000	36	980000	1512000	532000
		5	7	10	260,000	42,000	420000	160,000	70	1820000	2940000	1120000
	Total		27	46	1250000	210000	1932000	682000	246	6805000	10332000	3527000
	Average		5.4						9.2	250000	386400	136400
3	Kaleed	1	5	13	250,000	42,000	546000	296,000	65	1250000	2730000	1480000
		2	6	14	270,000	42,000	588000	318,000	84	1620000	3528000	1908000
		3	7	13	265,000	42,000	546000	281,000	91	1855000	3822000	1967000
		4	8	13	257,500	42,000	546000	288,500	104	2060000	4368000	2308000
		5	5	12	266,500	42,000	504000	237,500	60	1332500	2520000	1187500
	Total		31	65	1309000	210000	2730000	1421000	404	8117500	16968000	8850500
	Average		6.2						13	261800	546000	284200
4	Upper Zainganaing Gyi	1	8	15	250,000	42,000	630000	380,000	120	2000000	5040000	3040000
		2	5	16	260,000	42,000	672000	412,000	80	1300000	3360000	2060000
		3	6	12	275,000	42,000	504000	229,000	72	1650000	3024000	1374000
		4	7	13	265,000	42,000	546000	281,000	91	1855000	3822000	1967000
		5	8	15	255,000	42,000	630000	375,000	120	2040000	5040000	3000000
	Total		34	71	1305000	210000	2982000	1677000	483	8845000	20286000	11441000
	Average		6.8						14.2	261000	596400	335400

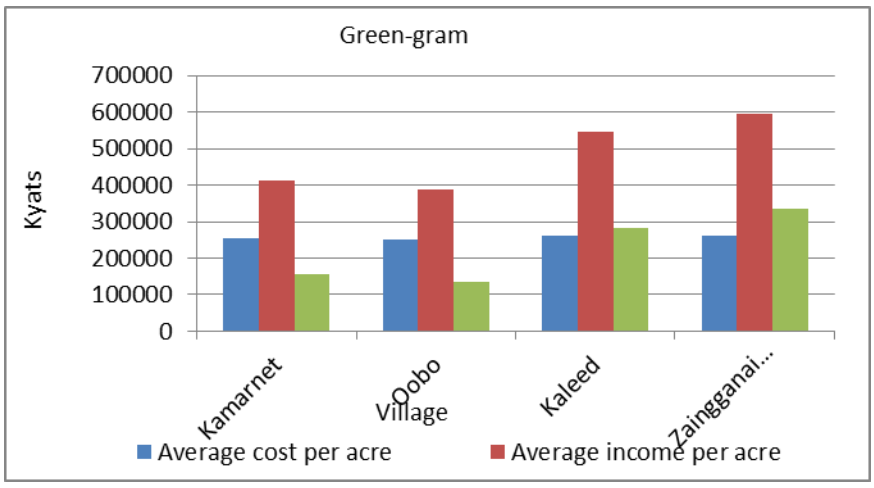


Fig.(4) Comparison of cost, income, profit per acre in four villages. (2018-2019)

Ground-Nut

Botanical name - *Arachis hypogael.*
Common name - Ground-Nut, Pean
Local name - Myae -Pe

Family - Fabaceae

Morphological characters

A monoecious prostrate to erect annual herb, stem cylindrical and hairy, unipinnately compound leaf with prominent stipules, palegreen and ovate to eliptic oblong leaflets. Flowers axillary, solitary cymes, yellow, monadelphous stamens with dimorphic anthers. Pods oblonged, reticulate with longitudinal ridges.Seeds ovoid to oblongoid.

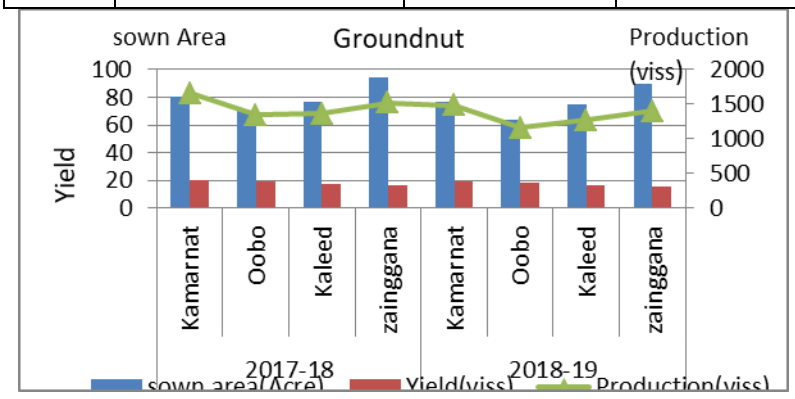
Agronomy

0.75 basket per acre seeds is needed for broadcasting and 0.25 basket per acre for line sowing. Row to row spacing is 12-18 inches and plant to plant distance is 6.8 inches. Supplement organic manures with chemical fertilizer 20 kg Nitrogen, 40 kg Phosphorus and 40 kg potassium/ha..The most serious fungal diseases of groundnut are leaf-spot rot.The crop is harvested when the basal leaves become yellow.Groundnut plant's life span to range from 90 to 120 days.

Production (Groundnut) The total production of Groundnut at four villages in Bago Township is 5893.55 (viss) from 321 acres in 2017-2018 and 5319.65 (viss) from 306 acres in 2018-2019. (Source: Settlement and Land Record Department of south Bago).

Table (5) Data obtained from Cultivation and Production of Ground-Nut in Bago Township

Year	Villages	Sown area (Acre)	Yield (Basket)	Production (Basket)
2017-18	Kamarnat	80	20.75	1660
	Oobo	70	19.2	1344
	Kaleed	77	17.75	1366.75
	Upper Zaingganaing Gyi	94	16.2	1522.8
	Total	**321**	**73.9**	**5893.55**
2018-19	Kamarnat	77	19.25	1482.25
	Oobo	64	18.1	1158.4
	Kaleed	75	17	1275
	Upper Zaingganaing Gyi	90	15.6	1404
	Total	**306**	**69.95**	**5319.65**



Fig(5) Sown Area, Yield and Production of Ground-nut from 2017 to 2019

Table (6)ata obtained dfrom Cultivation and Production of Ground-Nut in Bago Township (2018-2019)

No	Village	Cultivar	Cultivated Acre	Yield per Acre	Cost per Acre	Price per Acre	Income per Acre	Proift per Acre	Total Yield(viss)	Total Cost	Total Income	Total Profit
1	Kamarnat	1	13	20	285,000	60,000	1200000	915,000	260	3705000	15600000	11895000
		2	12	20	285,000	60,000	1200000	915,000	240	3420000	14400000	10980000
		3	10	20	295,000	60,000	1200000	905,000	200	2950000	12000000	9050000
		4	11	18	295,000	60,000	1080000	785,000	198	3245000	11880000	8635000
		5	10	19	300,000	60,000	1140000	840,000	190	3000000	11400000	8400000
	Total		56	97	1,460,000		5820000	4,360,000	1088	16320000	65280000	48960000
	Average		11.2						19.4	292000	1164000	872000
2	Oobo	1	7	9	285,000	60,000	540000	255,000	63	1995000	3780000	1785000
		2	10	11	295,000	60,000	660000	365,000	110	2950000	6600000	3650000
		3	7	10	295,000	60,000	600000	305,000	70	2065000	4200000	2135000
		4	10	12	290,000	60,000	720000	430,000	120	2900000	7200000	4300000
		5	11	13	285,000	60,000	780000	495,000	143	3135000	8580000	5445000
	Total		45	55	1,450,000		3300000	1,850,000	506	13045000	30360000	17315000
	Average		9						11	290000	660000	370000
3	Kaleed	1	7	16	285,000	60,000	960000	675,000	112	1995000	6720000	4725000
		2	7	15	285,000	60,000	900000	615,000	105	1995000	6300000	4305000
		3	10	18	285,000	60,000	1080000	795,000	180	2850000	10800000	7950000
		4	10	18	285,000	60,000	1080000	795,000	180	2850000	10800000	7950000
		5	8	16	285,000	60,000	960000	675,000	128	2280000	7680000	5400000
	Total		42	83	1,425,000		4980000	3,555,000	705	11970000	42300000	30330000
	Average		8.4						16.6	285000	996000	711000
4	Upper Zaingganaing Gyi	1	6	16	280,000	60,000	960000	680,000	96	1680000	5760000	1240000
		2	7	16	285,000	60,000	960000	103,000	112	1995000	6720000	515000
		3	7	15	280,000	60,000	900000	113,400	105	1960000	6300000	680400
		4	6	14	290,000	60,000	840000	139,400	84	1740000	5040000	975800
		5	5	14	285,000	60,000	840000	155,000	70	1425000	4200000	1240000
	Total		31	75	1,420,000	60,000	4500000	1,190,800	467	8800000	28020000	4651200
	Average		6.2		v				15	284000	900000	23960

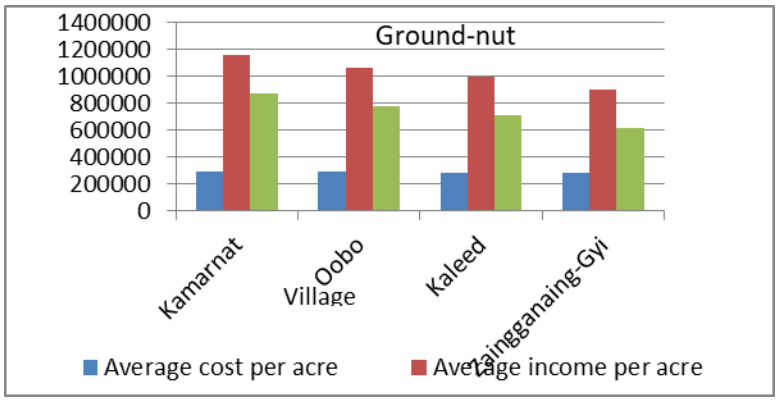


Fig.(6) Comparison of cost, income, profit per acre in four villages. (2018-2019)

Discussion and Conclusion

So, it can conclude that the study areas (four villages in southern part of Bago region) are rich in natural resources and there is a fair economic development. In the economic point of view, marketing mainly to Bago city to feed the city population's daily food consumption and rice and pulses are exported. Among these crops, groundnut is one of the most important industrial crops and Green-gram is the main source of income. Concerning with the Myanmar's rice, economic liberalization, sector policy reforms and better openness to innovation and international cooperation present promising signals for Myanmar rice sector. Because of water flooding, poor soil management and fungus outbreak cereals and crops were decreased within 2018-2019 compared with 2017-2018. Although plant growers used chemical fertilizers and pesticides, they have no knowledge to use them safely. There were no systematical economic important plants research center and research project in these study area. Among the study area of four villages in Bago Township, upper-Zaingganing-gyi village gets largest amount of income and production from cultivated crops compared with other villages because of soil fertility, and good planting techniques under the control of Myanmar Agriculture Service's personal.

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Byut-Tun Rice






Green-









Ground-nut