

## Investigation of Some Economic Pulses Crop in Monywa Township

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### Abstract

The plant products and their uses of some economic pulses crops such as green gram, pigeon pea, chick pea, lablab bean and lima bean are investigated in Monywa Township. The survey was carried out 15 villages within at Monywa Township from 2005. Questionnaires were prepared to collect the cultivated crops and marketing data used by questionnaire for baseline survey method. This study was constant to make the analysis of survey information and collected data in relation to agricultural based on some cultivated crops of the villagers and shopkeepers in this area. The present paper described target plants and their outstanding characters, agronomy, cultivated area, yield, economic value and folk uses. Collected data were edited and transferred into Microsoft Excel Program.

### Introduction

Economic botany is the branch of science which deals with the study of plants and their products in relation to their utility for mankind. The early man of the Stone Age depended totally on plants for his survival and developed means for utilizing these natural sources. As the human civilization progressed, its multifarious needs also increased and this led to a better understanding and appreciation of the plant kingdom and its economic importance. That plants could be used as food, it could provide fibers for making cloth, it was a source of wood for providing shelter (S.N. Pandy and A Chadha, 1996).

Agriculture occupies a dominant position in the development of the national economy of Myanmar, and has definite bearings on other socio-economic activities because of the rich land and water resources, man power resources and other material resources. Since the development in agriculture sector will enhance the socio-economic development of the country, the government has designated agriculture as the main pillar of the economy and is dedicating tremendous efforts to achieve greater progress in the sector. In Myanmar, more than 60 different crops in 8 groups, namely, cereal crops, oilseed crops, pulses, industrial crops, culinary crops, vegetables, fruits and other crops are grown based on the prevalence of different agro-ecological zones.

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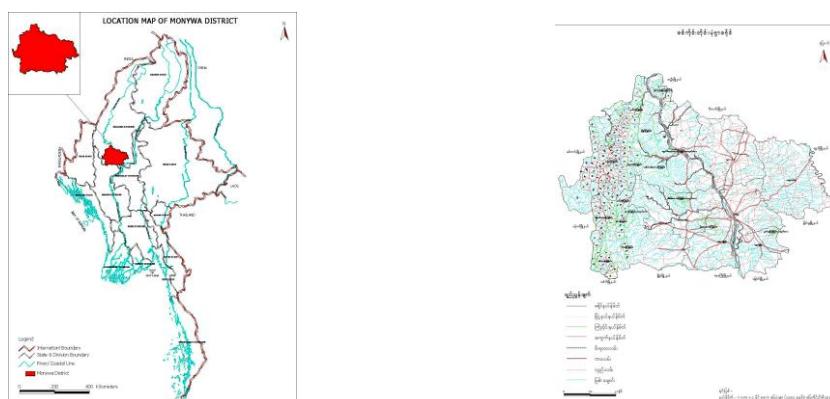
The pulses are the most important group of food plants and belonging to the family Fabaceae (Leguminosae). The cultivated pulses are feasible on a large scale in Monywa Township. The total acres of pulses in this area are grown about 69,277 acres and the total productions are 1,018,766 basckets (2005-2006). The production of pulses increased noticeably in response to market demands. The popular pulses of export constitute green gram, pigeon pea and chick pea.

Many beneficial effects such as the generation of foreign exchange, enrichment of soil fertility through nitrogen fixing symbiotic bacteria (Rhizobia) in crop rotation, the usefulness of its by-products like leaves and straws as animal feeds and as a source of protein for humans make it a worthwhile crop to expand production.

The aims and objectives of this paper are to record role of crops on economy of local peoples in Monywa Township and to inform the economic value of pulses crops.

### Methodology

The survey was carried out from 2005. This study was based on primary and secondary source of data. The primary data was collected from interviewing with the local farmers in these regions, namely Kyweye, Kawlapya, Phankharkyinn, Zalote, Ywatone, Ettaw and Kyauk-sit-pone, Aungthar, Thetkalkyinn, Kyaemone and Lezin. The random sampling method was used and one farmer was considered as one sampling unit. The 60 farmers were selected to make an interview. In this study, yield, production costs, income and benefits were calculated by Microsoft Excel Program. The secondary data were supported by Township Manager's Office, Myanmar Agriculture Service (MAS), Ministry of Agriculture and Irrigation (MOAI).



**Fig 1. The Map of the Monywa Township**



**Fig 2. Data collection from interviewing with the local farmers**

### Results and Discussion

The data obtained from interviewing the farmers, supported by officers from Myanmar Agriculture Service (MAS), the outline into description of pulses crops and statistical analysis of yield, cost, income and benefits of the crops in these regions were described. For the crop the taxonomic stated, outstanding characters, ecology, agronomy, diseases and pests, uses by folks and also those in literature were stated.

In the study area, chick pea, pigeon pea, green gram, lima bean and lablab bean were the major pulses cultivated.

**(1) Scientific Name** - *Cicer arietinum* L.

**English Name** - Chick pea

**Myanmar Name** - Kala-pe (ကူးပေး)

**Family** - Fabaceae

#### Outstanding characters

Annual, erect herbs; stems tetragonal. Leaves alternate, unipinnately compound, imparipinnate; leaflets ovate or elliptic. Flowers axillary or solitary, pink, small. Pods swollen, oblongoid. Seeds 1-2, subglobose or obovate, pale yellow to brown, white.

## **Ecology**

The crop is adopted to cool, dry conditions and grows almost exclusively on residual soil moisture. Optimum temperature range is 10-29°C. Soil types are sandy or sandy loam and the pH 6-9.

## **Agronomy**

The land is prepared by two times ploughing and one time harrowing and then cow-dung 3tons or T-superfertilizer or compound fertilizer 25kg were supplied. The seeds are directly sown in the field by broadcasting or sometimes the seeds are grown in row to row spacing 12" by dropping seeds from mid-October to the beginning of November. The intercropping system with sunflower, the seeds are mixed with sunflower and then are directly sown in the field. Weeds are removed after sowing of 30days. The crops are harvested by cutting the whole plant from January to February and then they are carried into the threshing ground by bullet-carts. The seeds are separated by peeling machine.

## **Diseases and Pests**

The common diseases in chick pea are the wilt and stunt; the pests are aphids, bollworm and bruchids.

## **Folk uses**

The fresh young leave shoots are eaten as salad. The seeds are boiled or fried or various dishes cooking as soup. It is grinded into pea flour which is used in cooking noodles in soup as coconut noodles and can be used to prepare tofu, pea-noodles and other snacks. Sprouted seeds are eaten as a vegetable or salad. The dried stems are also used the manure.

### **(2) Scientific Name- *Cajanus cajan* (L.) Millsp.**

**English Name - Pigeon pea**

**Myanmar Name- Pe-sin-nyone (ပေါ်ငိုးဂဲ)**

**Family - Fabaceae**

## **Outstanding characters**

Annual, erect shrub; stems 6 feet, branches, slender. Leaves trifoliate, pinnately compound; leaflets lanceolate or elliptic, acute, entire, hairy; petiolate; stipulate. Flowers terminal or axillary racemes, yellow. Pods oblongoid, hairy. Seeds 3-5, round or oval, brown, white or reddish brown.

## **Ecology**

The soil pH of 5-7 is generally required for optimum growth. They are extremely drought resistant since they have a long main root into the soil. The most favourable temperature range is 18-30°C.

## **Agronomy**

The land is prepared two times ploughing and three times harrowing. The crop is to grow as sole crop or mix cropping with sesame, sorghum, green gram and cotton. Sowing starts in June-July. If the sole crop cultivation, the seeds are sown by broadcasting; if the mix cropping, it is sown in single rows, alternating with four rows of other crops. This crop does not require irrigation and fertilizer application, but cowdung was supplied. Weeds are removed from the field by hand or chopping hoe after sowing of two months. The plants grow slowly and require about 9 months to mature. The whole plants are harvested by cutting with knife and then the cut plants are dried in the sunlight on the ground. The collected pods are threshed by trampling with cows.

## **Diseases and Pests**

The most common disease infecting pigeon pea is the sterility mosaic, wilt; the pests are aphids, spotted pod borer, bollworm, white grubs, termites and bruchids.

## **Folk uses**

The dried stems can be used for fuel and fence. The green leaves and broken pods are used as green manure and cattle feed. The seeds are eaten by boiling and frying. The green pods are used as vegetables.

### **(3) Scientific Name- *Vigna radiata* L.**

**English Name - Green gram, Mung bean**

**Myanmar Name- Pe-di-sein (ပေါ်စီစိုင်း)**

**Family - Fabaceae**

## **Outstanding characters**

Annual, erect herbs; stems cylindrical. Leaves trifoliate, pinnately compound; leaflets large ovate, entire. Flowers axillary raceme, greenish-yellow. Pods slender, pubescent, black. Seeds 10-15, green or yellowish-green, globose to ellipsoid.

## **Ecology**

The green gram is a short-day, temperature, rainfall and humidity. It can be grown in three seasons. The green gram is a warm season crop and grows within a

mean temperature range of 20-40 °C but the optimum being 28-30 °C. The crop does best on well drained loam or sandy loam, silty and clay, which pH range is 5.5-7.0.

### **Agronomy**

The land is ploughed by two times and harrowed by five times. Cow dung 2-3tons and chemical fertilizer 50kg per acre are applied. It is cultivated as sole crop or mixed crop or double cropping system. It is propagated by seeds and then the seeds are grown in the field by broadcasting from October to November in the winter season; in the rainy season from June to July and in the summer season from March to April. The summer green gram is needed to make the residual moisture or supplementary irrigation. Weeds removed by chopping hoe or handing after sowing of 25-30days. The mature pods are picked about three times according to its ripening by hand. The collected pods are threshed by trampling with cows.

### **Diseases and Pests**

The green gram is infected the diseases as powdery mildew and anthracnose; the pests as bean stem fly, striped flea beetle, white fly and green stink bug.

### **Folk uses**

Split of whole green gram seeds are eaten by boiling or roasting. Sprouted seeds and green gram pods are eaten as vegetables and then the seeds are eaten as soup. The green gram seeds are a preferred legume for the production of bean sprout. The whole plants are used as cattle feed and manure.

### **(4) Scientific Name- *Phaseolus lunatus* L.**

**English Name - Lima bean**

**Myanmar Name- Sultini, pe-gya (ရန်စုနိုင်ကြား)**

**Family - Fabaceae**

### **Outstanding characters**

Annual, erect herbs; stems twinning. Leaves trifoliate, pinnately compound; leaflets ovate-triangular, acuminate apex; stipulate. Flowers axillary raceme, yellow. Pods oblong. Seeds 2-4, kidney-shaped or round, white, red, brown.

### **Ecology**

The soil needs the silty and sandy. The well-drained soils of pH are 6.0-6.8. The optimum temperature is 16-27 °C.

## Agronomy

The land is ploughed by one time and harrowed by three times. It is grown as a sole crop or sometimes doubles cropping. The basal fertilizer of cow-dung 2tons or compound fertilizer 25kg per acre was supplied. The seeds are directly sown in the field by broadcasting from at the beginning of November. Weeds were removed for 20-30 days by chopping hoe or handing. The mature crops are harvested by cutting the whole plant from February to March. The harvested plants are dried the sunlight on the ground and then threshed by cow's feet.

## Diseases and Pests

The Lima bean is infected the wilt disease and the aphids pests, bollworm and bruchids.

## Folk uses

The seeds are cooked as the vegetables. The seeds mix with salt is roasted as snacks. The dried plants are used as cattle feed and manure.

### (5) Scientific Name- *Lablab purpurascens* (L.) Sweet

**English Name - Lablab bean**

**Myanmar Name- Pe-gyi (ပေါ်ကြီး)**

**Family - Fabaceae**

## Outstanding characters

Annual, erect herbs; stem cylindrical, twining. Leaves pinnately compound, trifoliate; leaflets ovate, pubescent. Flowers axillary raceme, white, pink or purple. Pods linear, flattened. Seeds 3-5, oblong, flat or inflated, white, kidney-shaped, separated the seeds.

## Ecology

It requires high temperature to grow well 18°C. The plants are grown on the sandy loam and clay soil, which is pH range of 5-7.8.

## Agronomy

The land is prepared by one time ploughing and three times harrowing. It can be grown as sole crop or double crop. The basal fertilizer such as cow dung 2 tons or compound 25kg per acre is supplied. And then, the seeds are directly sown in the field by broadcasting or sometimes row to row spacing 12" by iron plough-share from October to November. Weeds are removed for 25-30 days by handing or chopping hoe. The pods are picked by hand as soon as they ripe, until the plants reach full maturity and the remaining pods have ripened. At that stage, the entire plants are cutting to the ground with a sickle. The cut plants are dried for a few days before threshing.

### Diseases and Pests

The lablab bean is infected the disease as wilt and the pest as aphids and pot borer.

### Folk uses

The seeds are cooked as vegetables. The seeds mix with salt is roasted as snacks. The dried plants are used as cattle feed and manure.



**Fig 3.Chick pea**



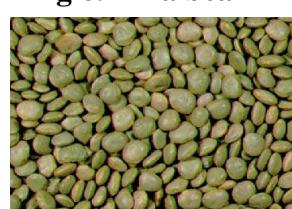
**Fig 4.Pigeon pea**



**Fig 5.Greengram**

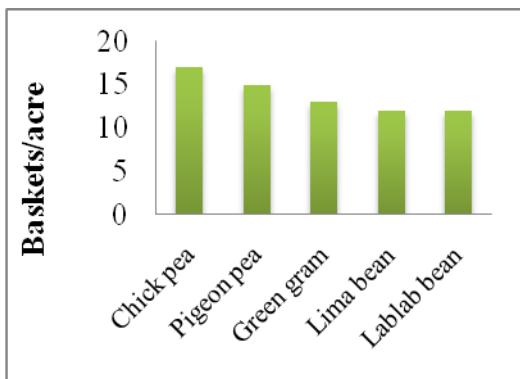


**Fig 6.Lima bean**

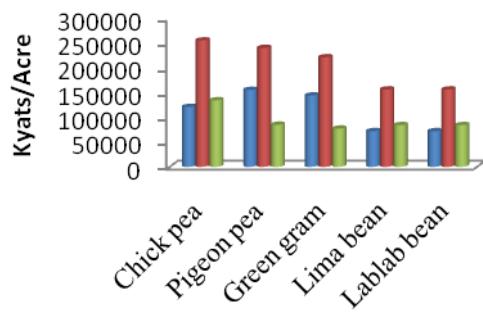


**Fig 7. Lablab bean**

### Statistical analysis of yield, cost, income and benefits of the crops in these regions



**Fig 8. One acre per yield of Pulses Crop**



**Fig 9. Costs, Income and Benefits of Pulses Crop**

In the study area, the average yield of the chick pea was highest 17 bas/acre, then secondly pigeon pea was 15 bas/acre and thirdly green gram was 13 bas/acre and therefore lima bean and lablab bean were the same as 12 bas/acre, respectively. The cost of the pigeon pea production was highest 155200 K/acre, then secondly green gram was 143990K/acre and thirdly chick pea was 120800 K/acre and therefore lima bean and lablab bean were 84100 K/acre, respectively. The greatest income obtained 255000 K/acre from the chick pea production, 240000 K/acre from the pigeon pea production, 221000 K/acre from the green gram production and then the lowest income was 156000 K/acre from the lima bean and lablab bean, respectively. Therefore, the net benefits achieved 134200 K/acre from the chick pea production, 84800 K/acre from the pigeon pea production, 77010 K/acre from the green gram production and then the lowest benefits was 84100 K/acre, respectively.

### Discussion

Myanmar is an agro-based country and agriculture is still the most important economic sector. Moreover, diversification of agriculture is one of the ways to achieve sustainable rural development, especially in the area of fragile ecosystems where high levels of agricultural inputs cannot provide good economic returns. It was mentioned the pulses crop in Jeswani, L. M. and Baldev, B. (1990) that the Indian farmer has been practicing the crops were sown by seeds on the land and reflected the need of the farmer. In growing of pulses crop, greatest profit can be obtained from chick pea as its yield was 134200 K/acre, which was more than the other pulses; pigeon pea, green gram, lima bean and lablab ban because it produced more yield. The lima bean and lablab bean were the lowest profit as its profit was 84100 K/acre.

So, the chick pea growers need to utilize more fertilizer than the other pulses and also the most promising varieties. Thus, for attaining the highest benefit and yield, soil type, irrigation facilities, investment, utilization of high yielding variety and knowledge on crop cultivation are the governing factors not only for Monywa Township but also for surrounding areas.

### **Conclusion**

Monywa Township, Sagaing Division was chosen for detailed analysis of the impact of agricultural diversification. Although Monywa is situated in the dry zone, there are different sources of water available for crops. The types of crops grown, proximity to town, and the source of irrigation water are the chosen criteria of these villages in Monywa Township. Observation among the villages depend upon the under-ground water with regard to safe drinking water. Monywa has different types of irrigation facilities like water from dams, ponds and underground water and crop exchange center. It is a relatively large and important city due to Indian border trade. Monywa has a big problem of soil degradation due to de-forestation because of population pressure, uneven intensity of rainfall. Moreover farmers in Monywa rely on pigeon pea cultivation as it is a drought resistant crop and its dry stems are valuable wood fuel for farmers. Likewise, pigeon pea based cropping pattern should be widely practiced in all over the township.

### **Acknowledgement**

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I would also grateful to Dr. Sandar Hlaing, Professor, Department of Botany, Taungoo University, for their kind permission to make this research.

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