

Short Communication

## **FINANCIAL VIABILITY OF THIRD SEASON GREENGRAM CULTIVATION IN HAMBANTOTA DISTRICT**

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### **INTRODUCTION**

Greengram is one of the major legume crop cultivated mainly in the Dry and Intermediate zones of Sri Lanka. The annual cultivated extent of 18,261 ha in 1996 dropped to 10,283 ha in 2010 producing 12,063 t (DCS, 2011). It is necessary to raise the production to 45,170 t by year 2015 (MFP, 2010). Hambantota is the leading district in greengram production in Sri Lanka in recent past with a 35 % contribution to national production in year 2011 (DCS, 2011). Addition to the conventionally cultivated greengram, the third season (*medakanna* from August-November) greengram cultivation has shown a remarkable success in recent years in the district. In year 2010, the Ministry of Agriculture has intervened to promote a third season cultivation of greengram in major cultivated areas and the highest success was reported in Hambantota. Rupasesna (2010) found that third season greengram growers received financial net benefits around Rs 11,000/ha. Weerakkody (2010) reported that third season greengram growers of Hasalaka received higher profits relative to greengram growers of Hambantota. Although some information on the financial viability of third season greengram cultivation is available, no studies have been undertaken to study the farmer perceptions on technology adoption, preference for variety attributes/technology components, and income and employment effects in detail. Therefore, the objectives of this study were to evaluate the financial viability of greengram cultivation in the third season and to identify constraints and potentialities to expand or sustain the third season greengram cultivation.

### **MATERIALS AND METHODS**

The study was based on a survey conducted in the Hambantota district in year 2012. Primary data were collected using a pre-tested questionnaire. Systematic random sampling technique was employed to select the sample units and two samples of farmers were selected to compare the third season (65 farmers) and conventional up land cultivation of greengram (30 farmers) from Weerawila, Yodhakandiya, Beralihela, Bandagiriya, and Ambalantota. Data on input, output price information, farmers' perception on adoptability and variety attributes, and details on availability of water, information on compatibility of third season cultivation to paddy-paddy farming system

were collected. Complete budgets were prepared with details of cost and benefits with simple land preparation and without land preparation, and compared with conventional up land cultivation. Differences of mean yields were statistically tested by t test. The following production function of log-log form was estimated.

$$\ln Y_j = \sum \beta_i \ln X_{ij} + \sum \gamma_i Z_{ij} + e_j$$

Where;

$Y_j$  = production of the  $j^{\text{th}}$  farm,  $X_{1j}$ =land extent cultivated (unit),  $X_{2j}$  = labour man days used,  $X_{3j}$ =expenditure on land preparation and chemical,  $\gamma_1$ -  $\gamma_5$  and coefficients of binary variables:  $Z_1(\text{ESTAB})=1$  for seeding with simple land preparation and 0 for seeding without land preparation,  $Z_2(\text{VAR})=1$  for recommended varieties and 0 for Australian variety,  $Z_3(\text{TIME})=1$  for establishment within the last two weeks of August and 0 otherwise,  $Z_4(\text{exp})=$  years of experience on third season cultivation,  $Z_5(\text{type})= 1$  if full time farmer and 0 if part time farmer.

## RESULTS AND DISCUSSION

Eighty eight percent of the farmers are full time farmers in the sample. Sixty five percent of farmers earned their income from paddy only and another 23% received income from paddy and fruits, vegetable or other field crops. On average, farmers earned an annual income of nearly Rs. 489,473.00 of which 70 % derived from paddy farming. Results also revealed that third season greengram cultivation has rapidly increased in recent past. The average cultivated extent of paddy in *yala* 2011 and greengram in third season 2011 were 1.25 and 0.96 ha, respectively.

There is a high variability of the date of sowing for individual farmers. The percentages of farmers seeded within the first, second, third and fourth weeks in August were 31 %, 27 %, 6 % and 32 %, respectively, and the balance 4 % of farmers cultivated in 1<sup>st</sup> week of September. This type of differences in seeding is unavoidable due to prevailing variations in harvesting date of paddy in previous *yala* season. Average seed rate was 23 kg/ha and ranged from 15-32 kg/ha (DOA recommendation is 25-30kg/ha). Only 45 % of the farmers used DOA recommended MI6 or MI5 varieties whereas the balance of the farmers used 'Australian' seeds available at the market for consumption. This indicates that availability of quality seed is fundamental to promote greengram cultivation system. Farmers' satisfaction on uniformity of 'Australian' seed is higher but level of diseases tolerance is lower relative to MI varieties. No considerable difference in preferences for attributes of germination, purity, and yield between two main varieties was recorded by farmers. The recommended MI varieties [MI5 (857 ± 207 kg/ha and ranged from 372-1,984) and MI6 (887± 351 kg/ha and ranged from 298-1,587] have given yields higher than yield of the Australian seeds (797 ± 513 kg/ha and ranged from 248-2,067).

Only 50 % of the farmers used recommended methods of establishment may be due to the variations in soil texture and moisture of paddy fields. About 11% of the

farmers filled water to the field within a short period of time after seeding, and removed water within a similar short period to reap adequate moisture in field for greengram sprout to emerge. The DOA recommended method of seeding after ploughing and again ploughing reported the highest average yield. It was evident that seeding methods with land preparation have given higher yields than the methods of without land preparation.

The estimated production function explains 65 % of the total variation. The intercept is large and highly significant indicates that major part of the yield variation is explained by factors exogenous to the model (Table 1). The estimated coefficient value (elasticity) indicated that 1 % increase of land increase production by 0.33 %, and 1 % increase of labour increases production by 0.68 %. The estimated value also indicates one can increase yield by 30% by delaying planting till second half of August. However, previous experience on third season cultivation, full time participation on farming was not significant (Table 1).

**Table 1. Variable and coefficient of the production function.**

| Variable        | Coefficient     | Description of variables              |
|-----------------|-----------------|---------------------------------------|
| Intercept       | 3.28 ***(8.05)  | Intercept                             |
| X <sub>1j</sub> | 0.331 *(1.86)   | Extent cultivated                     |
| X <sub>2j</sub> | 0.68 ***(5.89)  | Labour days used                      |
| X <sub>3j</sub> | 0.016 (1.09)    | Expenditure on land prep and chemical |
| Z <sub>1</sub>  | 0.220 (1.51)    | Establishment method                  |
| Z <sub>2</sub>  | 0.147 (0.919)   | Variety                               |
| Z <sub>3</sub>  | 0.306 *(1.94)   | Seeding time                          |
| Z <sub>4</sub>  | 0.069 (0.94)    | Experience on third season            |
| Z <sub>5</sub>  | -0.004 -(0.023) | Full time/part time participation     |

Note: R<sup>2</sup>=0.65, R<sup>2</sup>=0.60 t ratios are in parenthesis; \* Significant at 10% level; \*\* Significant at 5% level; \*\*\* Significant at 1% level.

Irrigation authorities have issued one turn of irrigation water for 94 % of the cultivated extent. Eighty six percent of the farmers were satisfied on water received. In certain places some of constraints had arisen in releasing water for third season due to lack of awareness on this cultivation system and inadequate organizing among relevant authorities. However, farmers were able to maintain the crop with available residual moisture in soil or pumped water once. The success of the third season cultivation is directly affected by the water availability in the previous *yala* cultivation due to greengram cultivated in residual moisture. All the farmers received adequate water for previous *yala* and used residual moisture for maintenance of the third season greengram cultivation in addition to the one turn of water issued by the Department of Irrigation. As some of the paddy lands were located at tail-end of the channel, the farmers had to pump water from reservoirs or other types of water sources. One turn of water was adequate for entire maintenance period of greengram cultivation as the crop germinated with residual soil moisture.

Adoption of combine harvesters has increased from 0 % in year 2004 to 100 % by 2011 and labour requirement in paddy farming has decreased from 90 man days/ha in *yala* 2004 to 48 man days/ha in *maha* 2011/12 (SEPC, 2010). Displacement of labour resulted in reduced income share of labour and increased income share for machinery. Ninety six percent of the displaced labour from paddy cultivation is compensated by the third season greengram cultivation. All the farmers reported that third season cultivation has not adversely affected on their leisure time.

Differences between greengram cultivation in paddy land in third season and in upland cultivation in normal *maha* season was also studied and all the following differences of third season made advantages to the farmer. (1) No need of bed preparation for cultivation; (2) no weed control; and (3) minimum application of pesticides. The reported disadvantages are: (1) increased weed density in paddy cultivation in next *maha* season; (2) difficulty of land preparation in next *maha* season; and (3) increase of rats breeding in the field.

The total cost of cultivation of third season greengram cultivation is lower than conventional upland cultivation (Table 2). Accordingly, third season cultivation with land preparation gives the highest net return and third season cultivation without land preparation gives the second highest net return and the conventional *maha* season system gives the lowest net return.

**Table 5.** Comparison of cost of cultivation of third season greengram cultivation.

| <i>Cost item</i>   | <i>Third season 2011 (with lp)</i> | <i>Third season 2011 (without lp)</i> | <i>Upland 2011/12 maha</i> |
|--|------------------------------------|---------------------------------------|----------------------------|
| Total cost of cultivation (Rs./ha)   | 43,240                             | 37,165                                | -                          |
| Differences of costs from conventional <i>maha</i> season                  | 46,655                             | 52,730                                | 89,895                     |
| Average yield (kg/ha)  | 925                                | 773                                   | -                          |
| Farm gate price (Rs./kg)   | 129                                | 129                                   | 977                        |
| Gross income (Rs./ha)  | 119,325                            | 99,720                                | 181                        |
| Differences of gross incomes from Conventional <i>maha</i> season (Rs./ha) | -                                  | -                                     | 176,840                    |
| Profit including imputed cost  | -                                  | -                                     | -                          |
| Profit excluding imputed cost  | -                                  | -                                     | -                          |
| Unit cost (including farm own inputs) (Rs./kg)                             | 57,515                             | 77,120                                | -                          |
| Unit cost (excluding farm own inputs) (Rs./kg)                             | 76,085                             | 65,955                                | -                          |
| Computed profit including imputed cost with 2011/12 <i>maha</i> price      | 82,180                             | 72,080                                | 86,945                     |
| Computed profit including imputed cost with third season price             | 46.74                              | 48.03                                 | 11,7620                    |
| Labor units used (man days)/ha   | 124,185                            | 102,750                               | 86,940                     |
| <b>Labor cost Rs/ha</b>  |                                    |                                       |                            |
| Land preparation cost  | 76,085                             | 65,925                                |                            |

Note: LP=land preparation.

Ninety six percent (96%) of the surveyed farmers were satisfied with the prices received and marketability of greengram production in the third season. Further, they reported that selling was easy since either buyers came to farm gate or the farmers could sell at the village market. Even though farm gate prices of third season was lower compared to farm gate price of *maha* 2011/12 season, only 4% of farmers were unsatisfied with price received. The Australian variety received the highest mean price at the farm gate (Rs. 133/kg), followed by MI 5 (Rs. 124/kg), and MI5 (Rs. 123/kg). Glossy appearance and largeness of seeds of the Australian variety leads to favourable price. Since all the surveyed farmers were members of the farmer society, they were receiving necessary inputs for cultivation. Majority of farmers were highly satisfied on agricultural extension service of facilitation follow up, field visit and instruction given while their satisfaction on support on seed supply was lower mainly due to inadequacy of seeds in state sector.

### CONCLUSIONS

Third season greengram cultivation has become an additional income source to the farmers in Hambantota district. Farm gate price and average yield received was low by 28 % and 5 %, respectively in the third season compared to *maha* 2011/12 season. Yet the third season cultivation of greengram is financially viable due to relatively lower cost.

### REFERENCES

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