COMPARATIVE PROFITABILITY ANALYSIS OF RECOMMENDED MUNGBEAN VARIETIES AT NARC EXPERIMENTAL STATION, ISLAMABAD, PAKISTAN

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ABSTRACT:- The present research study was designed to find out comparative profitability of different mungbean varieties cultivated at experimental station National Agricultural Research Centre (NARC), Islamabad and thus recommend a higher profit earning variety towards pulses growing areas of the country. Primary data of crop management practices was collected by Pulses Programme, NARC, Islamabad. Pulses Programme, NARC, cultivated different mungbean varieties for experimental purpose to find out the comparatively best variety in terms of economic benefit. The results of the study were anticipated to provide basis for devising strategy to improve and sustain future mungbean production. The scope for increasing production through adopting drought resistance high yielding varieties and improved management practice seems to contribute significantly. The output-input ratios of AZRI-06, NM-06 and NM-98 were 3.05, 2.79 and 2.41 with revenue crop day^{-1} acre^{-1} of Rs.451, Rs.368 and Rs.318, respectively. AZRI-06 variety showed higher profitability level with higher output-input ratio and revenue crop day^{-1} acre^{-1}. Adopting improved technology in mungbean production would further increase the returns at the farm level.

Key Word: Mungbean; Varieties; Profitability, Output-Input Ratios; Production; Pakistan.

INTRODUCTION

Food legumes like beans, peas, lentils, and ground nuts belong to the family Leguminosae, also called Fabaceae. They are mainly grown for their edible seeds, and thus also named as grain legumes. They play an important role in human nutrition because they are rich source of protein, calories, certain minerals and vitamins (Deshpande, 1992). The seeds of legumes used as human food are known as pulses. Pulses, one of humanity's oldest food crops got originated in the fertile crescent of the near east (Webb and Hawtin, 1981). Pulses are the major sources of dietary protein in the vegetarian diet in Pakistan. Besides being a rich source of protein, they maintain soil fertility through biological nitrogen fixation in soil and thus play a vital role in furthering sustainable agriculture (Kannaiyan, 1999).

The major pulses grown in Pakistan are gram (chickpea), field pea (*mutter*) and lentil (*masoor*) as winter legumes; and mungbean (green-gram), pigeon pea (red-gram) and *mash* (black-gram) as summer legumes. Mungbean (*Vigna radiata*),

also called green gram is a tropical legume, widely grown in Asia, particularly in Thailand, India and Pakistan. Mungbean is grown in Pakistan on largest pulse area second only to chickpea. Mostly it is grown as a cash crop in summer or autumn season. Its major concentration is found in the districts Bhakkar, Mianwali, Jhang, Khushab, Sargodha and Pothwar Region grown over area of 84818, 54596, 4495, 2559, 2466 and 3481 ha, respectively. In Pothwar Region its concentration found in the districts Jhelum (1336 ha), Chakwal (760 ha), Rawalpindi (1240 ha) and Attock (145 ha) (GoP, 2008-09). In Pakistan minor crops like pulses occupy 0.07 % of the total cropped area of 22.8 mha (GoP, 2011-12). Pulses such as chickpea, mungbean, *mash, masoor,* peas and other *kharif* and *rabi* crops occupy 1496400 ha, out of which 9.61% is under mungbean crop in Pakistan (GoP, 1992). Mungbean, as a crop, is growing both in rainfed as well as in irrigated areas of Pakistan. During 2010-11, this crop was badly affected by rain and flood. As a result, the production of mungbean fell short by 55%, i.e. 76.2 mt as compared with 118.7 mt produced during 2009-10 (GoP, 2011-12). It is a short duration crop therefore has less water requirement as compared to summer crops. More-over, it is drought resistant that can withstand adverse environmental conditions, and hence successfully be grown in rainfed areas (Anjum et al., 2006). Pakistan is spending large amount on import of pulses to fill the gap between its supply and demand. The serious concern is about low productivity of mungbean; the main reason for low productivity is lack of adopting high yielding varieties in the country (Table 1).

Punjab province is leading in area and production of mungbean. But it is alarming that yield of mungbean in Punjab (569kgha^{-1}) is lowest than KPK average yield (Table 1). The mounting pressure on the economy to feed more people has increased the importance of utilizing the potential rainfed regions of Pakistan to improve food security (Mahmood et al., 1991). There is a dire need to produce pulses crops on larger area in the country to fulfill the increasing demand of healthy food for the poor population. Pakistan Agricultural Research Council (PARC) has been focusing on hybrid seed development of important crops at federal level. Pulses Programme cultivated different mungbean varieties on experimental basis developed by Punjab Provincial Institutes, to analyze and recommend comparatively high yielding varieties for the farmers of mungbean growing

Table 1.   Area, production and yield of mungbean

Particular	Punjab	Sindh	KPK	Balochistan	Pakistan
Area (%)	76.78	7.86	6.18	9.17	100
Production (%)	78.74	5.77	6.69	8.79	100
Yield (kg ha^{-1})	569.00	407.00	600.00	532.00	555

Source: GoP, 2010-11

areas. The other purpose for the cultivation of mungbean varieties at NARC fields was to produce good quality seed at federal level.

The present study is specifically designed to calculate the economics of different mungbean varieties experimented by Pulses Programme, NARC, Islamabad and recommend specific variety for cultivation based on the economic benefit for the farmers of pulses growing areas.

MATERIALS AND METHOD

The fields of Pulses Programme, NARC, Islamabad were selected. A detailed questionnaire of agronomic practices was developed for the estimation of economic analysis of different cultivated varieties based on spring 2011-12 data which was supported by five years consistent repeated experiments on the mungbean varieties at NARC, Islamabad. This data set was pertaining to farm level experimental data on input cost of selected pulses varieties of mungbean.

Net value of the produced and cost involved were estimated. Cost of variables inputs such as land preparation, seed, fertilizer, sowing, weeding, pesticide, harvesting and threshing were computed. For the estimation of gross income, the value of product (grain) during the year was considered. To calculate the net incomes of selected mungbean varieties the following formula was adopted from Siddiqui et al. (1983) and Shah et al. (2007).

$$NR = GR - TVC$$
Where,
$\quad$ GR = Gross return and
$\quad$ TVC = Total variable costs

Profitability Analysis

To compare the net benefit of different mungbean varieties, profitability analysis was employed as was carried by Rahman (1998) and Ali (2004). Revenue day^{-1} indicates that how much a farmer can earn from growing a specific variety of the pulses. The output-input ratio and revenue day^{-1} acre^{-1} were calculated according to following formula.

Output-input ratio =

$$\frac{\text{Gross revenue (Rs. acre}^{-1})}{\text{Gross cost \quad (Rs. acre}^{-1})}$$

Revenue (crop day^{-1} acre^{-1}) =

$$\frac{\text{Gross revenue (Rs. acre}^{-1})}{\text{Crop duration (days)}}$$

RESULTS AND DISCUSSION

Economic Analysis

Mungbean is the dominant crop throughout the rainfed area. Management plays an imperative role in optimal utilization of the available resources. Proper management of different key inputs such as quality of seed, variety, method of sowing, timely sowing etc. not only increases the production but also decreases the cost of production and hence productivity and net returns could be increased without additional investment of resources. Within inputs, seed is the basis of crop production, which acts as genetic carrier, and use of quality seed of high yielding varieties is the key, which unlocks the door to dramatic surge of the productivity when combined with the use of other inputs under favorable environmental conditions. To have a better picture of returns per unit

area, net returns acre^{-1} was calculated (Table 2).

The cost of cultivating per acre of mungbean at NARC farm of AZRI-06, NM-06 and NM-98 were computed to be Rs. 17771, Rs. 15812 and Rs. 15800, respectively. The production for AZRI-06, NM-06 and NM-98 were 480, 400 and 360 kg acre^{-1}, respectively and rate of mungbean was Rs. 150kg^{-1} with a gross income of Rs. 72000, Rs. 60000 and Rs. 54000, respectively. The net profits were Rs. 54228, Rs. 44128 and Rs. 38200 acre^{-1} respectively. The output-input ratios were 3.05, 2.79 and 2.41, respectively. At the end revenue crop day^{-1} of AZRI-06, NM-06 and NM-98 were Rs.451, 368 and 318 acre^{-1} respectively (Table 2).

These results implied that mungbean cultivation was profitable enterprise in Pakistan. On the basis of profitability analysis best among these varieties was AZRI-06 due to its high yield and its crop day^{-1} was also very encouraging at Rs.451 acre^{-1} (Table 2). These management practices were recommended for pulses growing areas of Pakistan.

Table 2. **Economic profitability analysis of mungbean varieties**

(Rs. acre^{-1})

Items	AZRI-06	NM-06	NM-98
Input			
Cost of ploughing	3500	2500	2750
Cost of sowing	1111	1500	1000
Cost of seed	1680	1680	1780
Fertilizer	4300	4300	4300
Weeding cost	1200	600	650
Pesticide	1700	950	800
Harvesting cost	2250	1750	1350
Threshing cost	2030	2532	3170
Total cost of production	17771	15812	15800
Output			
Production (kg acre^{-1})	480	400	360
Price (kg^{-1})	150	150	150
Return from yield	72000	60000	54000
Profitability			
Gross income	72000	60000	54000
Net profit	54228	44188	38200
Output-input ratio	3.05	2.79	2.41
Revenue crop day^{-1} (Rs.)	451	368	318

Source: NARC Farm Data, 2012

Generally in these areas, farmers give little attention for their home produced seed and have no difference in grain and seed. Farmers did not distinguish between varieties of irrigated and rainfed areas, which is a serious constraint in overcoming the issue of low productivity of pulses. Electronic media should extensively be used for telecasting programme and projecting details of various components of the improved agricultural technologies. While through this research work farmers can easily adopt better option about mungbean variety.

The ultimate objective of this study was to find out the best mungbean variety for pulses growing areas that will lead to increase the income of the mungbean growers and improve the economic condition of resource poor farmers. It is thus concluded that there are opportunities for growers to enhance income from mungbean cultivation by getting potential yields. The empirical investigation revealed that AZRI-06 was the best variety among three selected varieties on the basis of high yield and higher revenue per crop day. These results implied that mungbean cultivation is very profitable enterprise and highly recommended for pulses growing areas of Pakistan subject to adopting high yielding varieties by farmers on their fields.

LITERATURE CITED

Ali, A. 2004. Profitability and prospects of canola cultivation under rainfed conditions of Rawalpindi and Chakwal Districts. Pakistan J. Arid Agric. 7(1): 39-42.

Anjum, M. S., Z. I. Ahmed, and C. A. Rauf. 2006. Effect of *Rhizobium* inoculation and nitrogen fertilizer on yield and yield components of mungbean. Int. J. Agric. and Biol. 8(2):238-240.

Deshpande, S. S. 1992. Food legumes in human nutrition: A personal perspective. Crit. Rev. Food Sci. Nutrition, 32: 333-363.

GoP, 1992. Economic Survey. Government of Pakistan. Finance Division, Economic Advisor's Wing, Islamabad. p. 67.

GoP, 2008-09. Economic Survey. Government of Pakistan. Finance Division, Economic Advisor's Wing, Islamabad.

GoP, 2010-11. Economic Survey. Government of Pakistan. Finance Division, Economic Advisor's Wing, Islamabad. p. 21-22.

GoP, 2011-12. Economic Survey. Government of Pakistan. Finance Division, Economic Advisor's Wing, Islamabad. p. 23.

Kannaiyan, S. 1999. Bioresources technology for sustainable agriculture. Associated Publishing Company, New Delhi. p. 422.

Mahmood, K., M. Munir, and S. Rafique. 1991. Rainfed farming systems and socio-economic aspects in Kalat Division (Highland Balochistan). Pakistan J. Agric. and Social Sci. 5: 15-20.

Rehman, A. 1998. Economics of canola production in Pakistan. M.Sc (Hons.) Agriculture Economics Department, University of Arid Agriculture, Rawalpindi.

Shah, A. N., K. M. Aujla, M. Abbas and K. Mahmood. 2007. Economics of chickpea production in the Thal Desert of Pakistan. Pakistan J. Life and Social Sci. 5(1-2):6-12.

Siddiqui, S. A., N. A. Ansari, and A. Q.

Ansari. 1983. Economic analysis of small animals farming in Sindh province of Pakistan. Goat Farming, p.89.

Webb, C. and G. Hawtin (eds). 1981. Press, Minneapolis. Lentils Commonwealth Agricultural Bureaux and ICARDA. p.69-90.