

Prospects of growing Spices, Medicinal and Aromatic Plants in Jute (Fibre cum seed) cropping system

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ABSTRACT: A field experiment was conducted at the research farm of the ICAR-Central Research Institute of Jute and Allied Fibres during 2014-15 to study the production potential and economic feasibility of growing medicinal and aromatic plants and spices in jute fibre cum seed based cropping system. The experiment was laid down in Split Plot Design with three replications. The experimental soil was sandy loam in texture with pH 6.8, high in organic carbon 0.66% , medium in available nitrogen (290 kg ha^{-1}), high in available P (36 kg ha^{-1}) and potash (234 kg ha^{-1}). In order to assess the most profitable jute (fibre cum seed)-MAPs and spices-boro rice sequence, five medicinal and aromatic crops were evaluated along with garden pea as prevailing traditional crop. Jute was raised for fibre as well as seed and after harvesting of crop, sowing of medicinal and spices viz isabgol, asalio, nagella, methi, coriander along with conventional crops as garden pea followed by boro rice was taken in jute(fibre cum seed)-MAPs and Spices- Boro rice cropping system. Jute (fibre cum seed)-nagella-boro rice gave maximum Jute equivalent yield of 47.99 q ha^{-1} followed by methi (46.55 q ha^{-1}) whereas prevailing traditional jute(fibre cum seed)-garden pea-boro rice sequence recorded 45.15 q ha^{-1} . Economic analysis of different cropping sequences revealed that the maximum net return was for Jute(fibre cum seed)-isabgol-boro rice cropping sequence ($\text{Rs.}42536 \text{ ha}^{-1}$) followed by methi ($\text{Rs.}26800 \text{ ha}^{-1}$) while net return of 23816 ha^{-1} was recorded in Jute (fibre cum seed)-garden pea-boro rice in case of traditional system. Though the net return was highest for medicinal plant isabgol and traditional crop garden pea , the benefit cost ratio was less (2.22 and 1.55 respectively) as compared to coriander (2.43). Therefore Coriander is recorded as the most profitable crop in the cropping sequence. Thus the result indicates that introduction of spices and medicinal plants in the existing jute (fibre cum seed)-MAPs and Spices-boro rice system is more remunerative and can be adapted by jute growing farmers for crop diversification.

Keywords: Jute equivalent yield , MAP, coriander, jute fibre-cum-seed based cropping system.

INTRODUCTION

Jute, known as golden fibre, is one of the major commercial crops of eastern and north eastern states of the country. It is grown as a pre-kharif (summer) season crop in succession with kharif (rainy) season crops mainly rice and rabi (winter) season crops, viz mustard and pulses (Mahapatra *et al.* 2012). It is grown about 1.0 million hectares providing livelihood security to 5.0 million people (Sinha *et al.*, 2009). Though there is two fold increase in productivity of Jute since independence, the area is stagnant and even declining over last two decades. However the increased cost of cultivation and fluctuating market price affects the farmers' income. There is necessity to make the jute farming most profitable to meet the challenges of competition from synthetic fibres with integration of high value crops

in the jute based system. The jute growing farmers mainly depend for their seed requirement on states like Maharashtra and Andhra Pradesh. The untimely availability of seed is one of the major cause of decline in production and productivity. Moreover the jute growing farmers cannot forego the cultivation of rice as it is the staple food of the Eastern part of the country.

Thus an attempt was taken to produce the fibre as well as seed from the same piece of land to reduce dependability for seeds from other states. So to enhance the profitability of jute farming we have to introduce high value crops such as spices and medicinal crops as components of jute based cropping system besides extending their cultivation to non traditional area. The inclusion of a variety of MAPs in existing cropping system in rotation or as inter

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crop with adaption of good agricultural practices is the key areas for further agronomic research which is the need of the hour (Rao *et al* 2009). Cultivation of MAPs with traditional crops as intercropping is emerging as a better enterprise. (Singh *et al* 2008). Hence cultivation of suitable spices and medicinal plant holds a great promise in jute based cropping system. Keeping this in view, an attempt was made to study the most economic and productive spices, medicinal and aromatic plants in jute based cropping system.

MATERIALS AND METHODS

The present experiment was conducted at Experimental Farm of the ICAR-Central Research Institute for Jute and Allied Fibres during 2014-15 to study the economic feasibility and production potential of growing spices and medicinal crops in jute (fibre cum seed) based cropping system. The experimental site is located at 88° 26' E longitude and 22° 35' N latitude 9m above mean sea level. The experiment was laid out in split plot design with three replications and two fertility levels *i.e.* Recommended dose of fertilizer and RDF + 5t FYM respectively. The soil of experimental field was sandy loam in texture with pH 6.8, high in organic carbon 0.66%, medium in available nitrogen (290 kg ha⁻¹), high in available P₂O₅ (36 kg ha⁻¹) and potash (234 kg ha⁻¹). In order to assess the most profitable jute(fibre cum seed)-Spices and MAPs-boro rice sequence, five spices and medicinal crops *viz* asalio, nagella, isabgol, methi and coriander were evaluated along with garden pea as prevailing traditional crop.

Jute was raised for fibre as well as seed and after harvesting of crop, sowing of medicinal and spices crops along with conventional crops as garden pea was taken up followed by boro rice. The crop was harvested at 165 days of sowing but usually jute grown for fibre is harvested at 110 days of sowing. So to protect the basal portion of the plant from over drying, 20% extra nitrogen of RDF and 2 supplement irrigation was provided at flowering and seed setting stage. The jute equivalent yield of fibre cum seed was calculated based on prevailed market price.

RESULTS AND DISCUSSION

Jute (fibre cum seed)-nagella-boro rice gave maximum Jute equivalent yield of 47.99q ha⁻¹ followed by methi (46.55q ha⁻¹) and isabgol (45.61q ha⁻¹) whereas prevailing traditional jute(fibre

Table 1
Total jute equivalent yield in jute (fibre cum seed) crop in q/ha

| Treatments | Fibre yield | Seed Yield | Jute Equivalent Yield | Total Jute Equivalent yield |
|--------------------------------|-------------|------------|-----------------------|-----------------------------|
| <i>Cropping Systems</i> | | | | |
| C1 = Jute-Asalio-boro rice | 33.55 | 4.03 | 11.76 | 45.31 |
| C2 = Jute-Nagella-boro rice | 34.24 | 4.71 | 13.75 | 47.99 |
| C3 = Jute-Methi-boro rice | 32.89 | 4.68 | 13.65 | 46.55 |
| C4 = Jute-Garden Pea-boro rice | 31.78 | 4.58 | 13.36 | 45.15 |
| C5 = Jute-Coriander-boro rice | 33.25 | 3.86 | 11.27 | 44.52 |
| C6 = Jute-Isabgol-boro rice | 32.01 | 4.66 | 13.6 | 45.61 |
| CD (0.05) | 0.85 | 0.93 | 2.7 | 1.70 |
| <i>Fertility Levels</i> | | | | |
| F1 | 32.78 | 4.34 | 12.66 | 45.44 |
| F2 | 33.13 | 4.5 | 13.13 | 46.26 |
| CD (0.05) | 0.31 | 0.13 | 0.4 | 0.19 |
| <i>Interaction (C × F)</i> | | | | |
| CD (0.05) | 0.79 | 0.33 | 0.98 | 0.81 |

cum seed)-garden pea-boro rice sequence recorded 45.15q ha⁻¹ (Table 1). Economic analysis of different cropping sequences revealed that the highest cost of cultivation was for garden pea (Rs. 66416 ha⁻¹). In jute (fibre cum seed)-MAPs and Spice-boro rice sequence, Jute(fibre cum seed)-isabgol-boro rice cropping sequence recorded the highest net return of Rs. 42536 ha⁻¹ followed by methi (Rs. 26800 ha⁻¹) and coriander (Rs. 26295 ha⁻¹) while net return of 23816 ha⁻¹ was recorded in Jute (fibre cum seed)-garden pea-boro rice in case of traditional system.

Table 2
Economics of MAPs and Traditional crops in jute (fibre cum seed) system

| Treatments | Yield | Gross | Net Income | BC Ratio |
|--------------------------------|-------|--------|------------|----------|
| <i>Cropping Systems</i> | | | | |
| C1 = Jute-Asalio-boro rice | 5.2 | 36416 | 20690 | 1.94 |
| C2 = Jute-Nagella-boro rice | 4.8 | 43580 | 24580 | 2.29 |
| C3 = Jute-Methi-boro rice | 8 | 46400 | 26800 | 2.35 |
| C4 = Jute-Garden Pea-boro rice | 32 | 66416 | 23816 | 1.55 |
| C5 = Jute-Coriander-boro rice | 10 | 44568 | 26295 | 2.43 |
| C6 = Jute-Isabgol-boro rice | 5.9 | 59000 | 42536 | 2.22 |
| CD (0.05) | 2.14 | 121.65 | 99.17 | 0.027 |
| <i>Fertility Levels</i> | | | | |
| F1 | 9.35 | 49487 | 27555 | 2.131 |
| F2 | 12.64 | 49306 | 27350 | 2.135 |
| CD (0.05) | 0.87 | 29.65 | 40.14 | 0.011 |
| <i>Interaction (C × F)</i> | | | | |
| CD (0.05) | 2.12 | 72.63 | 98.34 | 0.049 |

Though the net return was highest for medicinal plant isabgol and traditional crop garden pea, the benefit cost ratio was less (2.22 and 1.55 respectively) as compared to coriander (2.43) (Table 2). Therefore Coriander is recorded as the most profitable crop in the cropping sequence.

CONCLUSION

Thus study indicated that cultivation of spices and medicinal crops in the existing jute (fibre cum seed)-boro rice cropping system is more remunerative and can be adapted by jute growing farmers for crop diversification and seed production in the same piece of land reducing dependability of seeds on other states, thus making the system profitable.

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