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Development of Groundnut–Potato–Baby Corn Cropping System for Irrigated Medium Land of Tripura

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Abstract

In Tripura, rainfed rice-potato system is prevailing on medium upland. Due to changing the climatic condition and fluctuation in rainfall pattern make the cultivation of rice for uneconomical. The groundnut is emerging a new crop for rainfed condition and has the potential to replace the uneconomical rainfed rice. Short duration cash crop like groundnut, potato, baby corn etc. which is highly amenable to adjustment, fits in well in various cropping systems and efficiently utilized natural and socio-economic resources to maximize production and profitability in a sustained manner.

Introduction

The need for assured food security to the ever increasing population and shrinking availability of arable land has necessitated temporal and spatial intensification of cropping (Babu *et al.,* 2020). Short duration cash crop like groundnut, potato, baby corn etc. which is highly amenable to adjustment, fits in well in various cropping systems (Datta *et al.,* 2016). Cropping systems aim at efficient utilization of natural and socio-economic resources to maximize production and profitability in a sustained manner. In Tripura, rainfed rice-potato system is prevailing on medium upland. Due to changing the climatic condition and fluctuation in rainfall pattern make the cultivation of rice for uneconomical (Yadav *et al.,* 2020). The groundnut is emerging a new crop for rainfed condition and has the potential to replace the uneconomical rainfed rice. Besides that the growing demand of groundnut and potato in Tripura under changing climate force the researchers to develop the high remunerative and sustainable cropping system. Therefore Agronomy section of ICAR Tripura Centre developed the cropping system, which includes both groundnut and potato crops. Besides that another short duration crop baby corn was also included in this system. The detail description of the Groundnut–Potato–Baby corn cropping system is given below.

Suitable Ecology and Area

The system is most suitable for irrigated area with good drainage provision. Medium land, riverbeds and their adjoining areas, narrow area adjoining to channels where cultivation of rice is not profitable, having the irrigation facilities through lifting water with small pump or mini deep tube well. The water requirement of potato is much less as compared to *boro* rice.

Soil

Well drained sandy loam soil with sufficient organic matter content is most suitable for groundnut–potato–baby corn cropping system. All the crops of

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cropping system are tolerant to the slightly acidic soil. These crops can grow well on a soil having pH range from 5.0 to 6.5 in Tripura.

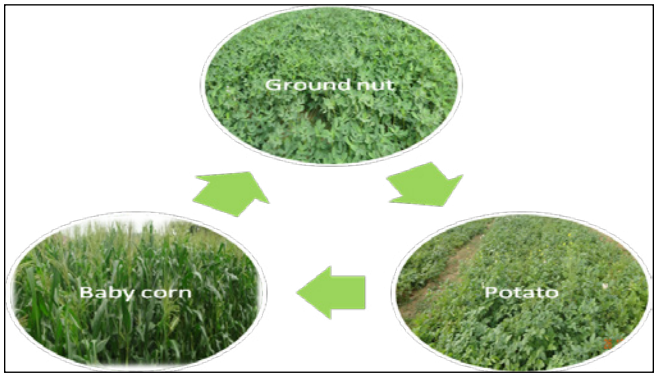

Figure 1: Groundnut–Potato–Baby Corn cropping system

Land Preparation

All the three crops of system require almost similar type of land preparation. Both groundnut and potato are shallow rooted crops. Therefore, they do not require deep ploughing. Only 2-3 ploughing with power tiller after harvest of each crop was made the field ready for sowing/ planting of crops.

Crop Varieties Grown in System

Groundnut : TG – 37A

Potato : Kufri Jyoti

Baby Corn : HM – 4

Sowing and Harvesting Time

The sowing and harvesting time of different crops are given in table 1. However, may vary from genotype to genotype and soil type. Therefore optimum sowing and harvesting time of different crop may have a range to fit well in the cropping system. The range of sowing and harvesting time of all three crops are given in table 2.

Table 1: Sowing and harvesting time of different crops

Sl. No.	Crop	Sowing/ planting time	Harvesting time	Duration (Days)
1	Groundnut	06/06/2013	30/09/2013	117
2	Potato	26/10/2013	29/01/2014	94
3	Baby corn	28/04/2014	16/06/2014	50
4	Total cropping system duration			261

Manure and Fertilizer

The nutrient requirement of different crops is different. Therefore we applied the recommended dose of fertilizer as per crop. Besides that 10 tonnes FYM/ha was applied before the sowing of ground nut crop, only once in a year. The amount of nutrient applied in the system is given Table 3.

Table 2: Sowing and harvesting time of different crops

Sl. No.	Crop	Sowing/ planting time	Harvesting time
1	Groundnut	Second fortnight of June to first fortnight of July	First fortnight of October
2	Potato	Second fortnight of October to first fortnight of November	February
3	Baby corn	March - April	June

Table 3: Nutrient applied in different crops

Crop	Nitrogen (kg/ha)	P_2O_5 (kg/ha)	K_2O (kg/ ha)	$ZnSO_4$ (kg/ha)
Groundnut	20	60	40	25
Potato	120	40	30	
Baby corn	80	40	40	

Water Management

Groundnut was grown as rainfed crop. Irrigation was applied only in potato and baby corn. Potato and baby corn was grown under ridge and furrow system, and water was applied in furrow only at 7 to 10 days interval depending on climatic conditions.

Intercultural Operations

The crops were sown under flatbed system. After emergence of crops earthing was done in groundnut and ridge and furrow was done in potato and baby corn. The schedule of intercultural operation is given in table 4.

Table 4: Schedule of intercultural operation

Crop	Earthing	Weeding	Ridge and furrow
Groundnut	First at 30 DAS, second at 45 DAS	First at 30 DAS, second at 45 DAS	
Potato	45 DAS	First at 30 DAS, second at 45 DAS	20 DAS
Baby corn		20 DAS	20 DAS

Production and Profitability

Production and economic profitability of different crops of the system is given in table 5.

Table 5: Production and economic profitability of different crops of the system

Crop	Yield of main products (t/ha)	Yield of by products (t/ha)	Cost of cultivation (Rs./ha)	Net returns (Rs./ha)	B:C ratios
Groundnut	2.1	4.2	40000	69200	2.73
Potato	31.1	-	75000	236000	4.15
Baby corn	3.7	40.5	25000	52500	3.10
System			140000	357700	3.55

The cultivation of groundnut–potato–baby corn cropping system on sandy loan soil with assured irrigation facilities require Rs. 1,40,000.00 as cost of production and gave a net befit to the farmers Rs. 3,57,700.00 in 260-270 days crop duration and increase the cropping intensity 300 percent. Therefore, we conclude that the groundnut–potato–baby corn cropping system is highly remunerative and sustainable cropping system for medium land, riverbeds and their adjoining areas, narrow area adjoining to channels where cultivation of rice is not profitable, having the irrigation facilities through lifting water with small pump or mini deep tube well in Tripura. Some photographs of healthy crop of groundnut, potato and baby corn are given below.

Figure 2: Groundnut

Figure 3: Potato

Figure 4: Baby corn

Conclusion

The cultivation of groundnut–potato–baby corn cropping system on sandy loan soil with assured irrigation facilities require Rs. 1,40,000.00 as cost of production and gave a net befit to the farmers Rs. 3,57,700.00 in 260-270 days crop duration and increase the cropping intensity 300 percent. Therefore, we conclude that the groundnut–potato–baby corn cropping system is highly remunerative and sustainable cropping system for irrigated medium type land in Tripura.

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