

Rainfed rice-based 3-crop systems with *paira/utera* crops in West Bengal, India

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Summary

Taking advantage of climatic conditions, land situation, soil type and different seasons (*rabi*, pre-*kharif* and *kharif*) of West Bengal, different *paira/utera* (no tillage relay) crops were studied under rainfed conditions with other crops in the seasons. The purpose was to improve yield production, maintenance of soil fertility and production economics. Studies were conducted at University Farms, Bidhan Chandra Krishi Viswavidyalaya (B.C. Agricultural University), Kalyani (22°39'N and 88°54'E) in West Bengal, India and commenced in 1989. Although other systems might be utilised according to different situations of West Bengal, out of many rainfed rice-based 3-crop systems studied with *paira* crops eight have shown to be important:

- (i) Transplanted *kharif* rice- *paira* grasspea- jute
- (ii) Transplanted *kharif* rice- *paira* lentil- jute
- (iii) Transplanted *kharif* rice- *paira* oat- mungbean
- (iv) Transplanted *kharif* rice- *paira* grasspea- mungbean
- (v) Transplanted *kharif* rice- *paira* grasspea- groundnut
- (vi) Transplanted *kharif* rice- *paira* sunhemp (for seed)- mungbean
- (vii) Transplanted *kharif* rice- *paira* sunhemp- mesta
- (viii) Transplanted *kharif* rice- *paira* mesta (for seed)- grasspea

Table 1. Direct, residual and cumulative effect of rainfed *rabi/paira* (no-tillage relay) crops (grasspea, linseed, mustard, lentil and oat) and tillage number on benefit/cost ratio of each crop in rainfed rice-based 3-crop systems in West Bengal, India.

<i>Rabi/paira</i> crops	Direct effect on <i>rabi/paira</i> crops				Residual effect on pre- <i>kharif</i> groundnut				Cumulative effect on <i>kharif</i> transplanted rice			
	Tillage (number of passes)				Tillage (number of passes)				Tillage (number of passes)			
	0	2	4	Mean	0	2	4	Mean	0	2	4	Mean
Grasspea	6.5	1.1	0.7	2.8	3.8	2.6	2.6	3.0	0.5	0.1	0.2	0.2
Linseed	3.1	0.6	0.1	1.3	3.3	2.3	2.4	2.7	0.2	0.1	0.2	0.2
Mustard	4.9	0.0	0.0	1.6	3.7	2.8	2.7	2.9	0.3	0.4	0.1	0.3
Lentil	5.6	1.5	1.4	2.6	3.4	2.7	3.1	3.1	0.7	0.4	0.3	0.5
Oat	5.1	2.5	1.4	3.0	4.0	2.5	2.8	3.1	0.1	0.1	0.1	0.1
Mean	5.0	1.2	0.7	2.3	3.6	2.6	2.7	3.0	0.3	0.2	0.2	0.3

Notes:

1. *Rabi* crops were grown with varying amounts of tillage from 4 passes to *paira* (0 passes) crops, whereas in pre-*kharif* (groundnut) and *kharif* (transplanted rice) season the land was tilled.
2. In the *rabi* season, *paira* crops of grasspea (*Lathyrus sativus* cv Nirmal 1), linseed (*Linum usitatissimum* cv Neelam), mustard (*Brassica juncea* cv B-85), lentil (*Lens culinaris* cv B77) and oat (*Avena sativa* cv Kent) were grown. In pre-*kharif* season, groundnut (*Arachis hypogea* cv ICGV 86124) and in *kharif* season transplanted rice (*Oryza sativa* cv Khitish) were grown.