

# Straw incorporated tillage seeding



# Rotavator (in-chopped straw) shallow working-higher work rate than MB plough based cultivation system

Type of straw field	Implement used	Time required, h/ha	Direct energy used, MJ/ha	Cost of operation, Rs/ha	Amount of straw incorporated, %
Combine harvested rice and wheat straw field (T1)	Stubble shaver (1)	2.75	508.06	511.99	-
	MB plough (1)	5.13	1151.46	1041.84	76.70
	Rotavator(1)	3.00	644.58	617.84	13.00
	Seed-Fertilizer drill(1)	3.71	696.63	678.93	-
Combine harvested rice and wheat (T2)	Stubble shaver(1)	2.75	508.06	511.99	-
	Rotavator(1)	3.58	721.30	768.71	60.43
Straw fields	Seed fertilizer drill(1)	4.88	916.39	893.04	-
Non-straw rice and wheat fields (T3)	Duck foot sweeps(3)	7.71	1446.87	1386.90	-
	Seed fertilizer drill(1)	2.99	560.53	546.26	-

# Production economics : straw fields

Particular(s)	Wheat straw/non straw (control) -rice sown			Rice straw/non straw (control)-wheat sown			Rice-wheat straw/non straw (control)-field		
	T1	T2	T3	T1	T2	T3	T1	T2	T3
Grain yield, t/ha	3.54	3.18	2.94	4.68	4.64	4.60	8.22	7.82	7.51
Cost of production, Rs/ha	10569	9805	10610	12020	10128	10710	22589	19933	21320
Benefit cost ratio	1.67	1.62	1.39	2.53	2.98	2.79	2.10	2.30	2.09

# Straw mulch minimum tillage rice-wheat



Treatment	Equipment used	Time required, h/ha	Operational energy MJ/ha	Cost of operation, Rs/ha	Total time required, h/ha	Total operational energy, MJ/ha	Total cost of operation, Rs/ha	Amount of straw incorporation, %
T <sub>1</sub>	Stubble shaver drill	3.45	653.68	648.60	8.71	1859.06	1979.44	54.4
	Roto till drill	5.26	1205.38	1230.84				
T <sub>2</sub>	Stubble shaver	3.45	653.68	648.60	8.21	1610.46	1591.08	-
	Zero till drill	4.76	956.78	942.48				
T <sub>3</sub>	Stubble shaver	3.45	653.68	648.60	11.57	2201.98	2277.08	62.1
	Rotavator	3.57	710.59	763.98				
	Seed cum fertilizer drill	4.55	837.71	864.50				

# Production economics of wheat after rice : straw covered and straw incorporated

Parameter(s)	Rice straw condition			Non-straw conv. practice			Non-straw conv. Practice
	Roto till drilled wheat	Zero till drilled wheat	Rotavator+ drill combination wheat	Roto till drilled wheat	Zero till drilled wheat	Rotavator+ drill combination wheat	
<b>Grain yield, t/ha</b>	<b>4.92</b>	<b>5.10</b>	<b>4.80</b>	<b>4.78</b>	<b>4.84</b>	<b>4.64</b>	<b>4.60</b>
<b>Cost of production, Rs/ha</b>	<b>9728</b>	<b>8885</b>	<b>10503</b>	<b>9315</b>	<b>8635</b>	<b>10128</b>	<b>10710</b>
<b>Benefit cost ratio</b>	<b>3.29</b>	<b>3.73</b>	<b>2.97</b>	<b>3.34</b>	<b>3.64</b>	<b>2.98</b>	<b>2.79</b>
<b>Operational energy, MJ/ ha</b>	<b>8746</b>	<b>8345</b>	<b>8946</b>	<b>8444</b>	<b>8114</b>	<b>9116</b>	<b>9516</b>

# Straw Combine



# Straw Baler