

**Supplementary file S1: Prevailing market prices for crop inputs during 2021–2022
and 2022–2023**

S.No.	Particular	Unit	Rate (₹)	
			2021-2022	2022-2023
	Land Preparation and Seed Purchase Cost			
1	Ploughing	acre ⁻¹	2700	2700
2	Rotavator	acre ⁻¹	2400	2400
3	Cultivator	acre ⁻¹	1800	1800
4	Seed drill	acre ⁻¹	1800	1800
5	Wages (Adult)	8 hours(day)	253	253
6	Rice	kg	39	41
7	Groundnut	kg	50	50
8	Pigeonpea	kg	150	150
9	Sweetcorn	kg	1900	1900
10	Bajra	kg	110	110
11	Sunhemp	kg	40	40
12	Bt cotton	450 g	853	853
13	Greengram	kg	115	115
14	Maize	1 kg	325	325
15	Hybrid napier	setts	1	1
16	Hedge lucerne	1 kg	600	600
	Other inputs			
17	Urea	45 kg	266	266
18	Single Superphosphate (SSP)	50 kg	350	350
19	Muriate of Potash (MOP)	50 kg	870	870
20	Zinc sulphate	10 kg	600	600
21	Multi K	1 kg	375	375
22	Emamectin benzoate	250 g	1250	1250
23	Acephate 75% SP	500 g	390	390
24	Coragen	30 ml	420	435
25	Quinolphos	250 ml	140	140
26	Heliokill	75ml	120	120
27	Blitox 505 WP (COC)	500 g	500	500
28	Saff	1 kg	580	580
29	Neem oil	1 litre	425	425
30	Atrazine 50% WP	1 kg	180	180
31	Penidmethalin (Stomp)	350 ml	250	250
32	Quizalofop ethyl (Turga super)	100ml	155	155

Supplementary file S2: Prevailing market selling price for output (main and by-products)during 2021–2022 and 2022–2023

S.No.	Particular	Unit	Rate (₹)	
			2021-2022	2022-2023
	Selling rate of crop produce and by produce			
1	Rice	kg	19.4	20.4
2	Groundnut	kg	52.75	58.5
3	Pigeonpea	kg	63	66
4	Sweetcorn	kg	9.0	9.0
5	Bajra	kg	22.5	22.5
6	Sunhemp	kg	2.0	2.0
7	Bt cotton	kg	57.26	63.8
8	Greengram	kg	72.75	77.55
9	Maize	kg	18.7	19.6
10	Guava	kg	30	30
11	Hedge lucerne	kg	3.0	3.0
12	Napier grass	kg	3.0	3.0
13	Green fodder	kg	3.0	3.0
14	Dry fodder	kg	1.0	1.0
15	Silage	kg	7.0	7.0
16	Horticultural waste	kg	1.0	1.0

**Supplementary file S3: Prevailing market prices for livestock inputs,
outputs (products and by-products) and fixed costs**

S.No.	Particular	Unit	Rate (₹)	
			2021–2022	2022–2023
	Livestock Purchase			
1	Nellore jodipi sheep lot I	5 Female +1 Male	22048	-
2	Nellore jodipi sheep lot II	5 Female +1 Male	23264	-
3	Aseel Poultry birds (1 Day old)	100 birds	3000	3000
	Livestock Output Prices			
4	Sheep live weight	kg	320	320
5	Poultry live weight	kg	300	300
	Livestock Outputs (By-Products) Prices			
6	Sheep manure	kg	0.25	0.25
7	Poultry manure	kg	0.25	0.25
	Livestock veterinary and other inputs			
8	Poultry vaccines	batch ⁻¹	337	337
9	Mineral mixture	kg	100	100
10	Concentrates	kg	22	22
11	Calcium bricks (for sheep)	brick ⁻¹	200	200
12	Poultry feed	50 kg	1350	1450
	Fixed cost			
13	Sheep shed	-	10000	-
14	Poultry shed	-	6000	-

**Supplementary file S4: Equivalent energy of different inputs used for energy analysis
in IFS model**

S.No.	Particular	Unit	Equivalent energy (MJ)
	Human Labour		
1	Adult man	Man-hours	1.96
	Woman	Woman-hours	1.57
	Fossil fuel		
2	Diesel	Litre	56.31
3	Petrol	Litre	48.23
4	Electricity	KWh	11.93
5	Water	litre	1.02
	Machinery		
6	Electric motor	kg	64.80
7	Farm machinery	kg	62.70
8	Prime movers other than electric motors (including self propelled machines)	kg	64.80
	Fertilizers		
9	Nitrogen (N)	kg	60.60
10	Phosphorus (P ₂ O ₅)	kg	11.1
11	Potassium (K ₂ O)	kg	6.7
12	Superior chemicals	kg	120
13	Zinc sulphate	kg	20.9
14	Inferior chemicals	kg	10.0
	Organic Manures		
15	Poultry manure	kg	0.3
16	Sheep manure	kg	0.3
	Seed inputs		
17	Cereals	kg	14.70
18	Pulses	kg	14.70
19	Oilseeds	kg	25
	Animal Feed		
20	Concentrates	kg	6.30
21	Mineral mixture	kg	2.00

**Supplementary file S5: Equivalent energy of different outputs used for energy
analysis inIFS model**

Sr. No.	Particular	Unit	Equivalent energy (MJ)
	Main Products		
1	Cereals and Pulses	kg (dry mass)	14.7
2	Oil seeds	kg (dry mass)	25.0
3	Cotton	kg (dry)	11.8
	Fodder Crops		
4	Hedge lucerne and napier grass	kg (dry mass)	18.0
	Animal Products		
5	Sheep	kg	4.94
6	Poultry	kg	21.75
	By-products		
7	Straw	kg (dry)	12.5
8	Plant wood	kg (dry)	18.0
9	Leaves and straw from orchard	kg (dry)	10.0
10	Cotton seed	kg (dry)	25.0

Table S1: Economics of various components in IFS model

Components	Season	Area (sq.m)/ No.	2021-22				2022-23				Mean			
			Cost of production	Gross returns	Net returns	B:C	Cost of production	Gross returns	Net returns	B:C	Cost of production	Gross returns	Net returns	B:C
Cropping System-I														
Rice	Kharif	1000	5322	10681	5359	2.00	5575	11485	5910	2.06	5449	11083	5634	2.03
Groundnut	Rabi	1000	5408	12779	7371	2.36	5570	13688	8118	2.46	5489	13234	7745	2.41
Rice-Groundnut		1000	10730	23460	12730	2.19	11145	25173	14028	2.26	10938	24317	13379	2.22
Cropping System-II														
Pigeonpea + Sweetcorn	Kharif	1000	7320	13840	6520	1.89	7560	16320	8760	2.16	7440	15080	7640	2.03
Bajra	Rabi	1000	3460	6180	2720	1.79	3550	7099	3549	2.00	3505	6640	3135	1.89
Pigeonpea + Sweetcorn (1:3)- Bajra		1000	10780	20020	9240	1.86	11110	23419	12309	2.11	10945	21720	10775	1.98
Cropping System-III														
Bt Cotton + Greengram	Kharif	1000	6757	13406	6649	1.98	7063	17299	10236	2.45	6910	15353	8443	2.22
Maize	Rabi	1000	4961	9933	4972	2.00	5108	12097	6989	2.37	5035	11015	5980	2.19
Bt Cotton + Greengram (1:2)-Maize		1000	11718	23339	11621	2.00	12171	29396	17225	2.42	11945	26368	14423	2.21
Cropping System-IV														
Pigeonpea + Maize	Kharif	1000	5805	15147	9342	2.61	5865	16198	10333	2.76	5835	15673	9838	2.69
Sunhemp	Rabi	1000	1675	3573	1898	2.13	1710	3611	1901	2.11	1693	3592	1899	2.12
Pigeonpea + Maize (1:3)-Sunhemp		1000	7480	18720	11240	2.50	7575	19809	12234	2.62	7528	19265	11737	2.56
Horticulture														
Guava Orchard	Perennial	2000	4140	10260	6120	2.48	4530	11343	6813	2.50	4335	10802	6467	2.49
Fodder crops														
Hedge Lucerne	Perennial	500	1935	12920	10985	6.68	2475	15752	13277	6.36	2205	14336	12131	6.50
Napier grass	Perennial	500	2815	38460	35645	13.7	3360	39270	35910	11.7	3088	38865	35777	12.59
Livestock unit														
Poultry unit		100	15015	30626	15611	2.04	15268	32395	17127	2.12	15142	31511	16369	2.08
Sheep lot I		5+1	41308	58162	16854	1.41	22944	41870	18926	1.82	32126	50016	17890	1.56
Sheep lot II		5+1	43418	63123	19705	1.45	27866	57730	29864	2.07	35642	60427	24785	1.70

Table S2. Energetics of individual components of IFS Model

Components	Area/ No.	Input energy (MJ)			Output energy (MJ)			Net Energy gain (MJ)		
		2021- 22	2022- 23	Mean	2021- 22	2022- 23	Mean	2021- 22	2022- 23	Mean
Rice - groundnut	1000	5293	5378	5336	24724	26091	25408	19431	20713	20072
Pigeonpea + sweetcorn - bajra	1000	5339	5343	5341	41196	48591	44894	35857	43248	39553
Bt cotton + greengram - Maize	1000	6066	6002	6034	25080	28431	26756	19014	22429	20722
Pigeonpea + maize - sunhemp	1000	4448	4473	4461	35860	36727	36294	31412	32254	31833
Cropping unit (Total)	4000	21146	21196	21171	126860	139840	133350	105714	118644	112179
Guava orchard	2000	1592	1601	1597	544	601	573	-1048	-1000	-1024
Hedge lucerne	500	1982	1995	1988	35816	43920	39868	33834	41925	37880
Napier grass	500	3130	3143	3137	107282	109529	108406	104152	106386	105269
Livestock										
Poultry	100	7360	7480	7420	2241	2373	2307	-5119	-5107	-5113
Sheep lot I	5+1	13535	35178	24357	682	967	825	-12853	-34211	-23532
Sheep lot II	5+1	15817	47346	31582	744	1272	1008	-15073	-46074	-30574