



International Journal of Research in Agronomy

E-ISSN: 2618-0618
P-ISSN: 2618-060X
© Agronomy
NAAS Rating (2026): 5.20
www.agronomyjournals.com
2026; SP-9(2): 09-15
Received: 06-11-2025
Accepted: 12-12-2025

Renu Kumari
Ph.D. Scholar, Department of
Agricultural Economics and
Management, Rajasthan College of
Agriculture, Udaipur, Rajasthan,
India

Dr. Hari Singh
Professor, Department of
Agricultural Economics and
Management, Rajasthan College of
Agriculture, Udaipur, Rajasthan,
India

Dr. GL Meena
Professor and Head, Department
of Agricultural Economics and
Management, Rajasthan College of
Agriculture, Udaipur, Rajasthan,
India

Dr. Latika Sharma
Professor, Department of
Agricultural Economics and
Management, Rajasthan College of
Agriculture, Udaipur, Rajasthan,
India

Corresponding Author:
Renu Kumari
Ph.D. Scholar, Department of
Agricultural Economics and
Management, Rajasthan College of
Agriculture, Udaipur, Rajasthan,
India

Economic evaluation of different farming system in Udaipur district of Rajasthan

Renu Kumari, Hari Singh, GL Meena and Latika Sharma

DOI: <https://www.doi.org/10.33545/2618060X.2026.v9.i2Sa.4832>

Abstract

The present study was carried out during 2024-25 in Udaipur district of Rajasthan, which was purposively selected as the AICRP on integrated farming systems (OFR) project was implemented there in 2011 to 2016. Two tehsils, Sarada and Salumber and three villages from each tehsil were chosen for the study. From each village, 10 households were selected, making a total sample of 60 households which were small and marginal farmers. Primary data were collected from the selected farmers using a pre-structured schedule. The study identified six distinct farming systems: FS-I (C + D), FS-II (C + D + G), FS-III (C + H + D), FS-IV (C + H + G + P), FS-V (C + D + G + P), and FS-VI (C + H + D + G + P), representing a progression from basic two-component systems to highly diversified, multi-enterprise models. The findings revealed that both total variable costs and total fixed costs increased with the degree of diversification and inclusion of additional farm enterprises. Consequently, the total cost (TC) was lowest in FS-I (₹1,48,778.18) and highest in the most diversified system, FS-VI (₹3,57,673.89). In terms of returns, gross returns were highest in FS-VI (₹8,34,100.65), followed by FS-III (₹5,17,901.59) and FS-V (₹4,80,131.97), highlighting the income-enhancing contribution of horticulture and integrated livestock components. A similar trend was observed in net returns (NR), where FS-VI recorded the highest net income (₹4,76,424.76), followed by FS-III (₹2,65,823.60) and FS-IV (₹2,15,759.02). The return per rupee of investment varied considerably among the farming systems and was highest in FS-VI (2.33), indicating superior investment efficiency of the crop, vegetable, dairy, goat, and poultry-based system. This was closely followed by FS-IV (2.32) and FS-III (2.05).

Keywords: Gross returns, farming systems, total cost, net returns, return per rupee of investment

Introduction

Indian agriculture has long carried the crucial responsibility of ensuring food and nutritional security for its vast population. The adoption of improved technologies, along with the progressive, innovative and entrepreneurial spirit of farmers led to significant production gains during the 1970s and 1980s. However, while these approaches boosted productivity, they also gave rise to several challenges such as environmental degradation, depletion of soil nutrients, disruption of soil biota, and rising production costs.

Major challenges faced by Indian agriculture are sustainability of natural resources, impact of climate change and decline in factor of productivity. The average size of operational farm holdings in India is steadily declining with a continuously growing population and decreasing per capita land availability. Therefore, the only viable path forward is vertical expansion integrating multiple farming components that require less space and time while providing sustainable and reasonable returns to farm families. In this context, agricultural diversification emerges as the most effective strategy to enhance productivity, income, and livelihood security. The adoption of various farming system approaches fits well into the funnel of diversified agriculture (Porkodi and Kannan, 2020) [8].

The IFS approach offers a dependable solution not only by enhancing overall productivity and reducing reliance on chemical fertilizers, but also by promoting ecological balance and long-term agricultural sustainability (Swaminathan, 1987). The emergence of IFS has enabled us to develop a framework for an alternative development model to improve the feasibility of small sized farming operations in relation to larger ones (Tejeswara Rao *et al.*, 2020) [9].

Integrated farming system approach is not only a reliable way of obtaining fairly high productivity with considerable scope for resource recycling, but also concept of ecological soundness leading to sustainable agriculture. Sustainable agriculture development must include IFS with efficient water, soil, crop and pest management practices, which are cost effective and environmentally friendly. Dairy by-products, particularly cow dung, serve as a key input for biogas production. The slurry left after biogas generation is highly beneficial in aquaculture, promoting plankton development and providing essential nutrients that enhance soil fertility and boost crop yields. Agricultural residues like paddy straw are extensively used in mushroom farming. After mushroom harvesting, the spent straw can be repurposed as cattle feed or used in composting. Likewise, poultry waste is a valuable resource in fish farming, encouraging plankton growth and improving land productivity. Beekeeping (apiculture) also contributes to agricultural efficiency by enhancing crop pollination, in addition to offering nutritious products such as honey. Altogether, these integrated practices help reduce dependency on chemical fertilizers and support sustainable farming. Moreover, IFS components are known to control the weed and regarded as an important element of integrated pest management and thus minimizes the use of weedicides as well as pesticides and thus protects the environment. The water use efficiency and water quality of IFS was better than conventional system.

There was on farm research conducted under AICRP on IFS at Sarada and Salumber tehsils of Udaipur district from 2011-12 to 2016-17. OFR provides the key inputs on location and situation. Specific crop production technologies and other enterprises such as poultry birds, goatry, dairy mineral mixtures, vermicompost units and horticulture inputs like vegetable seedlings, fruit plants *etc.* for achieving sustained productivity and profitability. It takes into account the biological socioeconomic and technological constraints operating at farmer's level. It provides a multidisciplinary approach with farming system perspectives and also helps in maintaining a direct link between on-station and on-farm research and is thus a first-hand source for feedback.

Objectives

1. To identify the existing farming system modules in study area, and
2. To estimate the cost and returns of the different farming system modules in study area.

Materials and Methods

The present investigation was carried out in 2024-25 to evaluate the different farming system in Udaipur district of southern Rajasthan, which were purposely selected for present study based on project of AICRP on IFS (OFR) was conducted in this district. Sarada and Salumber tehsils and three villages from each selected tehsil viz., Tulsio ka Namla, Roba and Bujhfala (Chatpur) from Salumber tehsil and Bovas, Chanda ji ka Guda, Padarda from Sarada tehsil from ere selected. 10 households from each village and 30 households from each tehsil were selected for the study which were selected for the project implementation. So, total 60 households were selected. The primary data were collected from selected farmers with pre structured schedule.

In order to fulfil the study objectives, established cost concepts were employed and a comprehensive cost-benefit analysis of the identified different farming systems was performed to obtain valid and meaningful conclusions.

The cost and return of different farming systems modules

Operational or variable costs

Operational costs were the actual costs incurred by the farmer along with incidental charges incurred towards labour and material costs. The various items of operational costs were seed, farmyard manure, fertilizers, plant protection chemicals, feeds and concentrates, fodder and straw, labour, (hired labour and family human labour) etc.

Fixed costs

The various items of fixed costs were the land revenue, land rent and depreciation. Consequently, the depreciation was calculate by using the straight-line method: -

$$\text{Depreciation (₹)} = \frac{\text{Purchase Value (₹)} - \text{Junk value (₹)}}{\text{Life Span (Years)}}$$

Interest on fixed capital was calculated at the prevailing bank rate (12%) on the value of the farm and livestock assets.

Total Cost (TC)= Total Variable Cost (TVC) + Total Fixed Cost (TFC)

A. Cost of cultivation was calculated by different cost concepts like

Cost A = TVC+ Depreciation on fixed assets

Cost B = Cost A+ Interest on fixed investments

Cost C = Cost B+ Imputed value of family labour

B. Cost of maintenance for livestock (in ₹) was calculated with the help of following items

1. Feed and fodder cost
2. Labour cost
3. Veterinary expenditure
4. Miscellaneous expenditure
5. Depreciation cost
6. Interest on fixed assets

Estimation of milk yield

The milk yield was estimated taking into account the quantity of milk produced by milking animals for the reference period of one year. The average daily milk yield was calculated taking into consideration the length of the period of the animal will in milk.

Cost of milk production

In order to work out the cost of milk production liter⁻¹ in the study area, the average maintenance cost milch animal⁻¹ day⁻¹ was divided by the average milk yield day⁻¹ of the respective milch animal.

$$\text{Cost of milk production liter}^{-1} = \frac{\text{Average Maintenance Cost /Milch Animal/Day}}{\text{Average Milk Yield / Milch Animal/Day}}$$

Cost of milk production (in ₹/head/year) was worked for different species of animals in both tribal and non-tribal.

Returns

Returns from crops, livestock, goat rearing, and poultry were estimated by multiplying the actual sale price by the quantity sold. Quantities retained for seed or household consumption were valued at the prevailing market rates at the time of harvest. The same procedure was followed for estimating the value of by-products from the different farm enterprises.

Results and Discussion

Identification of farming systems in selected district: The existing farming system in study area was identified and presented below

FS-I: Crop + Dairy (C+ D)

FS-II: Crop + Dairy +Goat (C+ D+ G)

FS-III: Crop + Horticulture + Dairy (C+ H+ D)

FS-IV: Crop + Horticulture + Goat + Poultry (C+H +G+P)

FS-V: Crop + Dairy + Goat + Poultry (C+ D+ G+ P)

FS-VI: Crop + Horticulture + Dairy +Goat + Poultry (C+ H+ D +G +P)

Table 1 reveals that farming in Udaipur district is predominantly characterized by diversified and integrated farming systems. Among the six identified systems, FS-VI emerged as the most dominant, adopted by 35.00 percent of farmers, accounting for the largest share of cultivated area (23.91%) and gross cropped area (2.47 ha). This system also recorded the highest cropping

intensity (281%), indicating intensive land use and effective integration of crop, horticulture, and livestock components. Overall, the average cropping intensity of the district was 223 percent, reflecting a high level of multiple cropping practices.

Less diversified systems such as FS-I and FS-II were adopted by a relatively smaller proportion of farmers (6.66% and 8.33%, respectively) and exhibited lower cropping intensity (155-192%). In contrast, systems integrating vegetables and multiple livestock enterprises, namely FS-III, FS-IV, and FS-V, showed markedly higher cropping intensities ranging from 181 to 269 percent.

Cost and return in existing farming systems of Udaipur district

Cost and return under FS-I

Table 2 presents the cost and return structure of the FS-I (Crop + Dairy) farming system in Udaipur district, operated on an average farm size of 0.45 ha.

Table 1: Existing farming system in Udaipur district (per farm)

Farming System	No. of Farmer	Cultivated Area (Ha)	Gross Cropped Area (Ha)	Cropping Intensity (%)	Crops		Horticulture		Dairy cattle	Goat	Poultry
					Name	Area	Name	Area			
FS-I (C+D)	4 (6.66)	0.45 (12.22)	0.69	155	Maize Cluster bean Wheat Gram	0.25 0.14 0.20 0.10	-	-	2.5	-	-
FS-II (C+D+G)	5 (8.33)	0.5 (13.58)	0.96	192	Maize Soyabean Cluster bean Wheat Gram	0.24 0.14 0.12 0.22 0.24	-	-	3.4	8.2	-
FS-III (C+D+H)	10	0.53 (14.40)	1.18	222	Maize Cluster bean Soyabean Wheat Gram Barley	0.24 0.07 0.08 0.21 0.13 0.03	Brinjal Bottle gourd Tomato Palak Turai Lemon	0.11 0.13 0.09 0.04 0.04 0.01	3.7	-	-
FS-IV (C+G+H+P)	12 (20.00)	0.6 (16.30)	1.61	269	Maize Cluster bean Wheat Gram Barley	0.23 0.18 0.26 0.10 0.12	Brinjal Bottle gourd Tomato onion Turai Muskmelon	0.18 0.17 0.14 0.06 0.10 0.07	-	7.5	8
FS-V (C+G+D+P)	8 (13.33)	0.72 (19.56)	1.30	181	Maize Cluster bean Soyabean Wheat Gram	0.39 0.14 0.20 0.35 0.22	-	-	3.6	6.5	8.2
FS-VI (C+D+G+H+P)	21 (35.00)	0.88 (23.91)	2.47	281	Maize Cluster bean Soyabean Wheat Gram Barley	0.40 0.21 0.12 0.36 0.20 0.07	Brinjal Bottle gourd Tomato Turai Palak Lemon Watermelon	0.11 0.23 0.17 0.19 0.05 0.02 0.33	3.9	6	8.1
Total		3.68 (100)	8.21	223		5.96		2.14	17.1	28.2	24.3

The total variable cost (TVC) for the system amounted to ₹ 113443.24 per farm, of which crops accounted for ₹ 22090.23, while dairy cattle incurred a substantially higher cost of ₹ 91353.01. Similarly, the total fixed cost (TFC) was ₹ 335,334.94, with ₹10954.03 attributed to crops and ₹ 24380.90 to dairy. Consequently, the total cost (TC) of the FS-I system was estimated at ₹ 148778.18 per farm, indicating that dairy enterprises constituted the major share of production costs. On the returns side, the gross returns (GR) from crops and dairy

were ₹ 61748.27 and ₹ 201377, respectively, resulting in a combined gross return of ₹ 263125.27 per farm. After accounting for total costs, the net returns (NR) from crops were ₹ 28704.30. Whereas, dairy farming generated significantly higher net returns of ₹ 85643.09, leading to an overall net return of ₹ 114347.39 per farm. The return per rupee of investment was 1.87 for crops, 1.74 for dairy, and 1.77 for the overall system, indicating that every rupee invested in the FS-I system yielded a return of ₹ 1.77.

Table 2: Cost and returns under FS- (₹/ farm)

S. No.	Particulars	Crops	Dairy Cattles	Total
A.	Cost			
1.	TVC	22090.23	91353.01	113443.24
2.	TFC	10954.03	24380.90	35334.94
3.	TC	33044.27	115733.91	148778.18
B.	Return			
1.	GR	61748.27	201377	263125.27
2.	NR	28704.30	85643.09	114347.39
3.	Return/Rs. Investment	1.87	1.74	1.77

Cost and return under FS-II

Table 3 presents the cost and return structure of the FS-II farming system in Dungarpur district. This system integrates crop production with dairy cattle and goat rearing, reflecting a moderately diversified farming pattern. The total variable cost (TVC) of the system amounted to ₹ 182534 per farm, of which the highest share was incurred on dairy cattle (₹ 1,26,325.09) followed by crops (₹ 29,420.66) and goats (₹ 26788.25). The total fixed cost (TFC) was ₹ 56,050.43, with dairy again accounting for the major share (₹ 29,283.83), indicating the capital-intensive nature of dairy farming.

The total cost (TC) of FS-II was estimated at ₹ 23,8584.44 per farm, comprising ₹ 45,011.26 for crops, ₹ 1,55,608.92 for dairy cattle, and ₹ 37964.26 for goat rearing. On the returns side, the gross returns (GR) from crops, dairy, and goats were ₹ 81682.4, ₹ 273871.70, and ₹ 54,288.9, respectively, resulting in a total gross return of ₹ 4,09,843 per farm. After accounting for costs, the net returns (NR) were highest from dairy (₹ 1,18,262.78),

followed by crops (₹ 36,671.09), while goat rearing generated relatively lower net returns (₹ 16,324.64). The return per rupee of investment was 1.8 for crops, 1.76 for dairy, and 1.43 for goat enterprise, leading to an overall return of ₹ 1.72 per rupee invested in the FS-II system.

Table 3: Cost and returns under FS-II (₹/ farm)

S. No.	Particulars	Crops	Dairy Cattles	Goat	Total
A.	Cost				
1.	TVC	29420.66	1,26,325.09	26788.25	182534
2.	TFC	15590.59	29,283.83	11176.01	56050.43
3.	TC	45011.26	1,55,608.92	37964.26	238584.44
B.	Return				
1.	GR	81682.4	273871.70	54288.90	409843
2.	NR	36671.09	118262.78	16324.64	171258.50
3.	Return/Rs. Investment	1.8	1.76	1.43	1.72

Cost and return in FS-III

Table 4 presents the cost and return structure of the FS-III farming system in Udaipur district. This system integrates crop production with horticulture production and dairy cattle. The total variable cost (TVC) was highest for dairy cattle (₹ 1,30,201.08), followed by horticulture (₹ 36,499.23) and crops (₹ 24,827.76). Similarly, total fixed cost (TFC) was also maximum in dairy cattle (₹ 37,236), resulting in the highest total cost (TC) of ₹ 1,67,437.08 among the components. Overall, the total cost incurred under FS-III was ₹ 2,52,077.99 per farm.

Table 4: Cost and returns district under FS-III (₹/farm)

S. No.	Particulars	Crops	Horticulture	Dairy Cattles	Total
A.	Cost				
1.	TVC	24827.76	36499.23	130201.08	191528.07
2.	TFC	12803.67	10510.25	37236	60549.92
3.	TC	37631.43	47009.48	167437.08	252077.99
B.	Return				
1.	GR	69728.67	150134.92	298038	517901.59
2.	NR	32097.24	103125.44	130601	265823.60
3.	Return/Rs. Investment	1.85	3.19	1.78	2.05

On the returns side, dairy generated the highest gross return (₹ 2,98,038), followed by horticulture (₹ 1,50,134.92) and crops (₹ 69,728.67). Net returns were from horticulture (₹ 1,03,125.44), indicating their strong profitability within the system. Dairy cattle contributed a net return of ₹ 1,30,601, while crops provided ₹ 32,097.24. The total net return from FS-III amounted to ₹ 2,65,823.60 per farm. The return per rupee of investment was highest in horticulture (3.19) followed by the overall farming system (2.05), crops (1.85), and dairy cattle (1.78).

Cost and return under FS-IV

Table 5 depicts the cost structure and returns of different farm enterprises under FS-IV in Udaipur district. The average operational area under this system was 0.6 ha. Among the enterprises, horticulture incurred the highest total variable cost (₹ 59,770.09) followed by crops (₹ 28,819.84), goat rearing (₹ 27418.93), and poultry (₹ 2,020.88). Fixed costs showed a similar pattern, with horticulture accounting for the highest total fixed cost (₹ 17,610.92). Consequently, the total cost was maximum for horticulture (₹ 77,381.02), followed by crops (₹ 43,875.84), goat (₹ 37,617.04) and poultry (₹ 2,524.00). The overall total cost under FS-IV amounted to ₹ 1,61,397.73 per farm.

In terms of returns, horticulture emerged as the most

remunerative enterprise, generating the highest gross return of ₹ 2,39,569.38, followed by crops (₹ 83,042.87), goat rearing (₹ 49,654.50), and poultry (₹ 4,890). Net returns were also highest from horticulture (₹ 1,62,188.36), indicating their dominant contribution to farm income. Crops yielded a net return of ₹ 39,167.03, while goat and poultry enterprises contributed comparatively lower net returns of ₹ 12,037.50 and ₹ 2,366, respectively. The total net return from FS-IV was ₹ 2,15,759.02 per farm. The return per rupee of investment further highlights the economic efficiency of the enterprises. Horticulture recorded the highest return per rupee invested (3.09).

Table 5: Cost and returns under FS-IV (₹/farm)

S. No.	Particulars	Crops	Horticulture	Goat	Poultry	Total
A.	Cost					
1.	TVC	28819.84	59770.09	27418.93	2020.88	118029.74
2.	TFC	15056	17610.92	10198.07	503.12	43367.99
3.	TC	43875.84	77381.02	37617.04	2524.00	161397.73
B.	Return					
1.	GR	83042.87	239569.38	49654.50	4890	377156.75
2.	NR	39167.03	162188.36	12037.50	2366	215759.02
3.	Return/Rs. Investment	1.89	3.09	1.32	1.94	2.33

Cost and return under FS-V

Table 6 presents the cost structure and returns of different farm enterprises under FS-V in Dungarpur district, with an average operational holding of 0.72 ha. Among the enterprises, dairy farming incurred the highest total variable cost (₹1,36,821.1), followed by crops (₹ 41,465.05), goat rearing (₹ 22,894.54), and poultry (₹ 2015.56). Fixed costs were also maximum in dairy (₹ 39,848.90), resulting in the highest total cost (₹ 1,76,670) among all components. The total cost of cultivation and allied activities under FS-V amounted to ₹2,75,135.67 per farm.

With respect to returns, dairy farming generated the highest gross return (₹ 3,15,792), followed by crops (₹1,16,606.52), goat (₹ 42,872.05), and poultry (₹ 4,861.4). Net returns were also dominated by dairy (₹1,54,580), indicating its major contribution to farm income under FS-V. Crops and dairy provided net return of 53,187.02 and ₹ 1,39,122, respectively, whereas goat rearing and poultry yielded comparatively low net returns of ₹ 10,348.49 and ₹ 2,339.18, respectively. The overall net return from FS-V was ₹ 2,04,996.30 per farm.

Table 6: Cost and returns under FS-V (₹/ farm)

S. No.	Particulars	Crops	Dairy	Goat	Poultry	Total
A.	Cost					
1.	TVC	41465.05	136821.1	22893.54	2015.56	203196.20
2.	TFC	21954.45	39848.90	9629.46	506.66	71939.48
3.	TC	63419.50	176670	32523.56	2522.22	275135.67
B.	Return					
1.	GR	116606.52	315792	42872.05	4861.4	480131.97
2.	NR	53187.02	139122	10348.49	2339.18	204996.30
3.	Return/Rs. Investment	1.84	1.79	1.32	1.93	1.74

The return per rupee of investment for crop production was 1.84 closely followed by dairy (1.79). Poultry shows most profitability with 1.93 return per rupee of investment. Goat rearing recorded the lowest return per rupee invested (1.32). Overall, the farming system achieved a return of ₹1.74 per rupee of investment, indicating moderate profitability. The results suggest that while dairy farming plays a pivotal role in income generation under FS-V.

Cost and return under FS-VI

Table 7 summarizes the cost structure and returns of various enterprises under (FS-VI) in Udaipur district, with an average operational holding of 0.88 ha. The total variable cost (TVC) was highest for dairy farming (₹ 1,11,041.48), followed by horticulture (₹ 94,682.90), crops (₹ 37,588.96), goat rearing (₹

18,908.83), and poultry (₹ 2,008.56). Fixed costs were also substantial in dairy (₹ 43,986.10), resulting in the highest total cost (₹ 1,55,027.58) among all enterprises. The overall total cost incurred under FS-VI was ₹ 3,57,673.89 per farm. In terms of returns, horticulture generated the highest gross return (₹ 3,52,469.41), closely followed by dairy (₹ 3,14,148.15) and crops (₹ 1,22,836.89). Goat and poultry enterprises contributed comparatively smaller gross returns of ₹ 39,723.6 and ₹ 4,922.59, respectively. Net returns were maximum from horticulture (₹ 2,36,067.31), highlighting their superior profitability. Dairy farming yielded a net return of ₹ 1,59,120.57, while crops provided ₹ 65,420.23. Goat rearing and poultry contributed modest net returns of ₹ 13,457.64 and ₹ 2,361.00, respectively. The total net return from FS-VI amounted to ₹ 4,76,426.76 per farm.

Table 7: Cost and returns in Udaipur district under FS-VI (₹/farm)

S. No.	Particulars	Crops	Horticulture	Dairy	Goat	Poultry	Total
A.	Cost						
1.	TVC	37588.96	94682.90	111041.48	18908.83	2008.56	264230.73
2.	TFC	19827.69	21719.20	43986.10	7357.12	553.03	9344317
3.	TC	57416.66	116402.10	155027.58	26265.96	2561.59	357673.89
B.	Return						
1.	GR	122836.89	352469.41	314148.15	39723.6	4922.59	834100.65
2.	NR	65420.23	236067.31	159120.57	13457.04	2361.00	476426.76
3.	Return/Rs. Investment	2.13	3.02	2.02	1.51	1.92	2.33

The return per rupee of investment further reflects the economic efficiency of different enterprises. Horticulture recorded the highest return per rupee invested (3.02), followed by the overall farming system (2.33), crops (2.13), dairy (2.02), poultry (1.92) and goat rearing (1.51).

Comparison of cost and return in Udaipur district

Table 8 and figure 1 are presenting a comparative analysis of costs and returns of different farming systems in Udaipur district. The results indicate that both total variable cost and total fixed cost increase with the level of diversification and inclusion of multiple farm enterprises. Accordingly, the total cost (TC) is lowest in FS-I (₹ 1,48,778.18) and highest in the most

diversified system, FS-VI (₹ 3,57,673.89).

With respect to returns, the gross returns are highest in FS-VI (₹8,34,100.65) followed by FS-III (₹ 5,17,901.59) and FS-V (₹ 4,80,131.97) highlighting the income-enhancing role of horticulture and integrated livestock components. A similar pattern is observed for net returns where FS-VI records the maximum net income (₹ 4,76,424.76), followed by FS-III (₹ 2,65,823.60) and FS-IV (₹ 2,15,759.02).

The return per rupee of investment varies considerably across farming systems presents in figure 2. It is highest in FS-VI (2.33), indicating superior investment efficiency of the crop, vegetable, Dairy, goat and poultry system. This is followed by FS-IV (2.32) and FS-III (2.05).

Table 8: Comparison of cost and returns in different farming systems (₹/Farm/Year)

Particulars	FS I	FS II	FS III	FS IV	FS V	FS VI	Overall
TVC	113443.24	182534	191528.07	118029.74	203196.20	264230.73	178826.99
TFC	35334.94	56050.43	60549.92	43367.99	71939.48	93443.17	60114.32
TC	148778.18	238584.44	252077.99	161397.73	275135.67	357673.89	238941.31
GR	263125.27	409843	517901.59	377156.75	480131.97	834100.65	480376.54
NR	114347.39	171258.50	265823.60	215759.02	204996.30	476426.76	241435.26
Return/Rupee Investment	1.77	1.72	2.05	2.33	1.74	2.33	2.01

Internally cost adjustment in various farming system in Udaipur district

Table 9 presents the pattern of internal cost adjustments and their implications for profitability across different integrated farming systems in Udaipur district. The results reveal that a substantial proportion of total production cost in all farming systems was met from resources generated within the farming system itself. The share of internal costs ranged from 61.92 per

cent in FS-I to 73.63 per cent in FS-VI, indicating effective recycling and utilization of farm-produced inputs such as family labour, farmyard manure, fodder, seed, and feed. Correspondingly, the dependence on externally purchased inputs remained relatively low, varying between 26.37 and 38.01 per cent. At the overall level, 69.64 per cent of total costs were incurred within the farming system, highlighting the dominance of internal resource use in the study area.

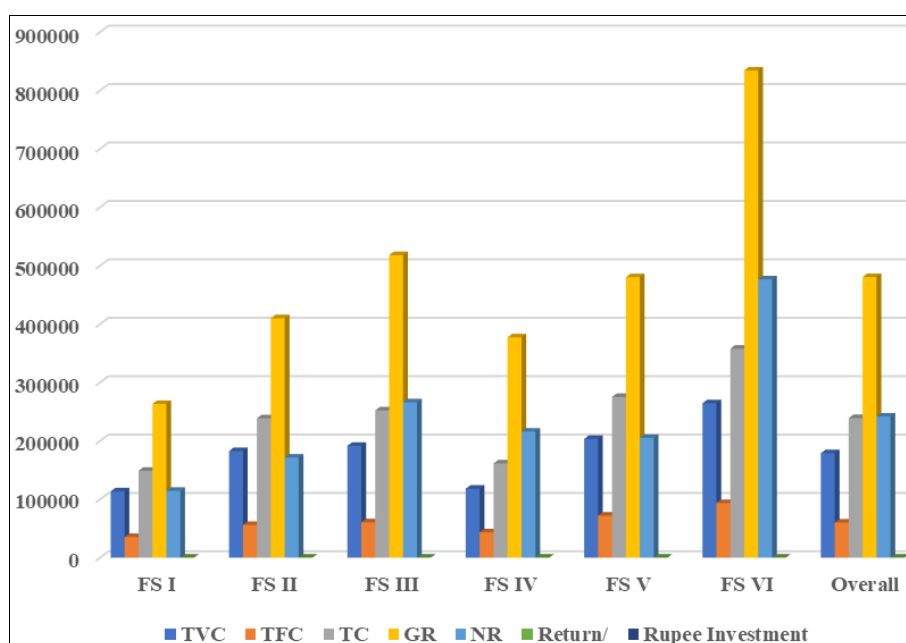
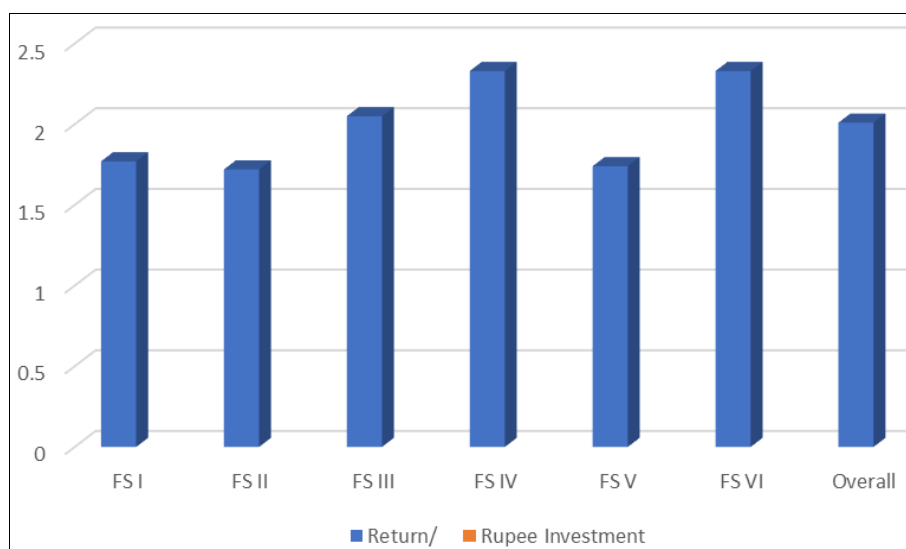
**Fig 1:** Comparison of cost and returns under different farming system in Udaipur district**Fig 2:** Comparison of return per rupee invested in different farming systems

Table 9: Internal cost adjustments in various farming systems in Udaipur district

Integrated Farming System	Gross Returns (₹)	Cost			Cost Share (%)		Return/ Cost Ratio
		Within Farming System (₹)	Outside Farming System (₹)	Total Cost (₹)	Within Farming System	Outside Farming System	
FS-I	263125.27	92123.45	56639.85	148778.18	61.92	38.07	1.77
FS-II	409843	153505.23	85079.21	238584.44	64.34	35.66	1.72
FS-III	517901.59	182756.54	69296.23	252077.99	72.50	27.49	2.05
FS-IV	377156.75	107474.75	53906.84	161397.73	66.59	33.40	2.33
FS-V	480131.97	199060.66	76075.01	275135.67	72.35	27.65	1.74
FS-VI	834100.65	263355.28	94318.60	357673.89	73.63	26.37	2.33
Overall	480376.54	166379.31	72562.00	238941.31	69.64	30.36	2.01

Gross returns increased with the degree of enterprise integration, with the highest gross returns recorded under FS-VI (₹ 8,34,100.65) followed by FS-III (₹ 5,17,901.59) and FS-V (₹ 4,80,131.97). Although FS-VI involved higher absolute costs, its strong internal cost component (73.63 per cent) indicates efficient resource utilization within the system. Total costs were comparatively lower in less diversified systems such as FS-I and FS-IV, reflecting smaller scale and fewer enterprises.

The return–cost ratio varied across farming systems, reflecting differences in economic efficiency. The highest return–cost ratio was observed in FS-VI and FS-IV (2.33 for each), followed by FS-III (2.05) indicating superior profitability of these systems despite variations in cost structure. At the aggregate level, the overall benefit–cost ratio was 2.01, signifying that integrated farming systems in Udaipur district are economically viable.

Conclusion

- The inclusion of horticulture significantly enhanced land use efficiency, while the addition of goats and poultry provided supplementary income and risk buffering. FS-VI appears to be a highly remunerative and diversified farming system, where the integration of horticulture and dairy significantly enhances farm income, while small livestock components such as goat and poultry provide supplementary income and risk mitigation for farmers.
- The findings clearly indicate that diversified and integrated farming systems, particularly those incorporating vegetables along with small ruminants and poultry, are more profitable and economically efficient than less diversified systems. Promotion of such integrated farming systems can therefore, play a vital role in enhancing farm income and ensuring sustainable livelihoods for farmers in the region.
- The composition of costs clearly demonstrates that diversified farming systems are better positioned to absorb higher costs through enhanced returns. The findings underscore that farming systems with higher internal cost shares and balanced enterprise integration not only reduce dependence on external inputs but also improve profitability and sustainability.

Policy implications

The benefits of IFS adoption could be extended to a larger population through policies that address the constraints in the adoption of technology, like extending credit facilities, education, and awareness. Improved access to technology will increase both the spread and intensity of IFS adoption. This also needs to be accompanied by sufficient infrastructure facilities at backward and forward production linkages.

References

- Balusamy M, Shanmugham PM, Baskaran R. Mixed farming: an ideal farming system. *Intensive Agriculture*. 2003;41(11-12):20-25.
- Gajbhiye S, Bagde NT, Rathod VJ, Kayarwar AB, Ansari RA, Shraddha B. Economic evaluation of integrated farming system in eastern Vidarbha zone. *International Journal of Research in Agronomy*. 2024;7(9):675-680.
- Kuchimanchi BR, Bosch RR, de Boer IJM, Oosting SJ. Understanding farming systems and their economic performance in Telangana, India: not all that glitters is gold. *Current Research in Environmental Sustainability*. 2022;4:100-120.
- Malgwi CJ, Mailumo SS, Akpoko JG. Comparative estimation of the costs and returns of integrated fish-based farming systems in Kaduna Metropolis, Nigeria. *Asian Research Journal of Agriculture*. 2017;6(3):1-9.
- Malik M, Jawla SK, Kumar T, Sahrawat A. Comparative study on cost of cultivation and economic returns from rice–wheat and sugarcane–wheat cropping pattern in western region (Meerut) of Uttar Pradesh. *The Pharma Innovation Journal*. 2021;10(3):158-162.
- Manjunatha T, Puttaswamaiah S. Comparative economic analysis of organic and conventional farming in Karnataka. *Indian Journal of Economics and Development*. 2022;17(4):757-766.
- Netam AK, Sahu B, Netam CR. Impacts of integrated farming system on socio-economics and livelihood sustainability of small and marginal farmers in Chhattisgarh. *International Journal of Current Microbiology and Applied Sciences*. 2019;8(4):822-829.
- Porkodi G, Kannan S. Impact of integrated farming system approach on sustainable production for farming community. *International Journal of Current Microbiology and Applied Sciences*. 2020;9(4):2345-2350.
- Rao KT, Rao MMVS, Nagarajuna D. On-farm evaluation of farming system modules for improving profitability and livelihood of small and marginal tribal farmers in high altitudes tribal zone of Andhra Pradesh. *Agriculture Update*. 2020;15(3):181-187.
- Rajini DDA, Sreenivas G, Gayathri P, Srilaxmi B. Economic evaluation of integrated farming systems (IFS) in Jagtial district of Telangana. *Plant Science Today*. 2025;12(1):1.