



Research Paper

To study the cost of cultivation of *Aloe-vera* crop on the college farm v/s farmers' fields

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ABSTRACT : *Aloe (Aloe vera)* is an important and traditional medicinal plant belonging to the family Liliaceae. The finding of the study revealed that total cost of cultivation of *Aloe vera* at farmers' field was estimated at Rs. 39753.71 per hectare. The establishment cost and maintenance cost accounted for Rs. 29671.16 and Rs. 10082.55 per hectare, respectively. Planting material cost accounted the major share in total costs on the farmer's field. Harvesting, interest on working capital, weeding and hoeing, planting cost, interest on fixed capital, transportation, farm yard manure and irrigation charges were the other major components of cost of cultivation of *Aloe vera* crop. The total cost of cultivation of *Aloe vera* was found Rs. 54038.84 per hectare at college farm excluding salary permanent employees. Of this, Rs. 42918.32 per hectare was establishment cost and Rs. 11120.52 per hectare as maintenance cost. In total cost without salary, planting material, interest on working capital, planting cost, weeding and hoeing, harvesting, transportation, interest on fixed capital and depreciation were the major components of cost at college farm. The total cost of cultivation of *Aloe vera* at college farm was found Rs. 1, 24,378.88 per hectare, while the salary of permanent employees was taken into account. Out of this, Rs. 96123.15 per hectare was establishment cost and Rs. 28255.73 per hectare as maintenance cost. In total cost with salary, the salary of the permanent employees was the single largest cost item at college farm. The net present worth was found Rs. 33761.1 per hectare and Rs. 30043.12 per hectare at farmer's field and college farm (excluding salary), respectively. The net present worth was estimated to be negative (Rs. -32559.52 per hectare) when salary of staff was included in the cost in the study of college farm. Various economic viability tests for investment on *Aloe vera* cultivation indicated that *Aloe vera* cultivation on farmer's field was an economically viable proposition. The cultivation of *Aloe vera* was not found to be an economically viable proposition if salary of permanent labour was taken into account.

KEY WORDS : Cost of cultivation, *Aloe-vera* crop

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INTRODUCTION :

Aloe (Aloe vera) is an important and traditional medicinal plant belonging to the family Liliaceae. It is a

xerophytic plant and can be grown even in drylands under rainfed situation. In the present model, the unit cost for the development of *Aloe vera* in 1 ha of land works out to be Rs. 87500.00. The financial assistance for the cost

of development can be arranged as bank loan. Bank loan of 85.95 per cent of the total cost of development shall be available from the financing institutions.

MATERIALS AND METHODS :

Sample selection and data collection :

Jaipur district was selected purposively due to vicinity of college. Thus, six villages namely Nayabas, Macharkhani, Dyodi, Ragunandanpura, Pratapura and Bhojpura having highest area under *Aloe vera* cultivators finally selected for investigation. For the study, both primary and secondary data were collected. Primary data were collected from *Aloe vera* cultivators on pre-structured and pre-tested schedule. The objectives of the study were primarily considered in preparing the schedule. After preparing schedule, actual field work was started and data were collected from selected growers through personal interview. It has ensured the supply of reliable data without any personal and social biases. The data were collected for five years from 2008 to 2012 specially for payback period.

Analysis of data :

The data so obtained were thoroughly checked for consistency and accuracy. Having checked the data, the same were transferred on master sheet to have a clear view of the data before subjecting them to further classification and analysis.

Concepts and definitions of terms and variables:

The concepts and definitions of economic variables used in this study are outlined in this section.

Labour:

Hired/casual/permanent labour:

This category included the hired/ casual/ permanent labour employed in *Aloe vera* production. The payment made in cash and kind was considered.

Family labour :

It included actual work carried out by family members for *Aloe vera* crop. This labour was valued on the basis of prevailing rates paid to the hired labour for the same category and nature of work.

Owned machinery charges :

It was evaluated at the hiring charges prevailed in

the villages.

Irrigation charges:

Owned irrigation water charges were accounted at per the rates of hired irrigation water charges prevailing in the locality. For hired irrigation water charges, the amount actually paid by the *Aloe vera* growers was considered.

Land revenue:

Land revenue actually paid to revenue department was considered.

Earned value of rented land :

Rental value of own land was calculated on the basis of prevailing rates in the sample villages.

Interest on fixed capital:

Interest on present value of fixed assets (excluding land) such as implements, machinery, buildings and wells was calculated at the rate of 10 per cent per annum.

Interest on working capital:

Interest on working capital was calculated at the rate of 12 per cent per annum.

Depreciation :

It is a decline in the value of a given asset as a result of the use, wear and tear, accidental damage and time obsolescence. Straight line method was used for computing the depreciation.

$$\text{Depreciation} = \frac{\text{Purchase price of the asset} - \text{Junk value}}{\text{Number of useful years of life (expected life)}}$$

After calculating total annual depreciation of the farm, the depreciation for a particular crop was worked out. This was done as follows :

$$\text{Depreciation for Aloe vera crop} = \frac{\text{Total annual depreciation}}{\text{Total cropped area}} \times \frac{\text{Area under Aloe vera crop}}{\text{Total cropped area}}$$

Cost concepts:

Since the structure of cost for the cultivation of *Aloe vera* is quite different to the traditional crop farming, the following cost concepts are devised.

Establishment cost:

All the costs incurred by the *Aloe vera* growers

from preparation of land upto planting of plants were denoted as establishment costs. We have not included the cost of land in the establishment cost. Establishment cost pertains to the cost incurred on land preparation, planting material, tools, etc.

– Establishment cost = Land preparation + Cost of plants + Cost of planting of plants + Tools and other costs

– Fixed cost = Land revenue + Earned value of rented land + Depreciation + Interest on fixed capital

– Variable cost = Cost of manures and fertilizers including labour cost + Irrigation charges including labour cost + Labour cost of weeding + Harvesting of *Aloe vera*

– Total establishment cost = Fixed cost + Variable cost

Maintenance cost :

Even after the establishment of the crop the *Aloe vera* cultivators have to continue incurring expenditure year after year on regular basis for its maintenance. Depending on the nature of cost incurred, the maintenance cost was grouped as variable cost and fixed cost. Variable cost included expenses on items viz. manures and fertilizers, irrigation, Weeding and hoeing, harvesting and interest on working capital. Fixed cost constituted interest on fixed capital, depreciation, land revenue and earned value of rented land. The total maintenance cost was obtained by adding the variable cost and fixed cost.

– Fixed cost = It included interest on fixed capital, depreciation on capital items, land revenue and earned value of rented land.

– Variable cost = It included expenses on items like manures, irrigation, weeding and hoeing, harvesting, transportation and interest on working capital.

– Total maintenance cost = Fixed cost + variable cost .

Total cost:

Establishment cost + maintenance cost.

Total cost of cultivation:

The cost of cultivation of *Aloe vera* was worked out by considering the following cost items:

Cost A₁:

- Value of hired human labour.
- Value of owned bullock labour.
- Value of hired bullock labour.

– Value of owned machine labour.

– Value of hired machine labour.

– Value of owned seed.

– Value of purchased seed

– Value of owned farm yard manure

– Value of purchased farm yard manure

– Value of fertilizers and insecticides

– Irrigation charges.

– Land revenue.

– Interest on working capital.

– Depreciation

– Miscellaneous expenses.

– Rent paid for the leased in land

– Interest on fixed capital

– Rental value of owned land

– Value of family labour

Cost A₂: Cost A₁ + rent paid for leased in land.

Cost B₁: Cost A₁ + interest on fixed capital

Cost B₂: Cost B₁ + rent paid for leased in land + rental value of owned land

Cost C₁: Cost B₁ + value of family labour.

Cost C₂: Cost B₂ + value of family labour.

The structure of cost of cultivation of *Aloe vera* is different from the traditional crop farming the following cost concepts were devised.

Establishment cost:

All the cost incurred by the *Aloe vera* growers from preparation to planting of plants are involved in it.

– Establishment cost = Land preparation + cost of plant + cost of planting of plant + tools and other cost

– Fixed cost = Establishment cost + land revenue + rental value of owned land + depreciation + interest on fixed capital.

– Variable cost = Cost of manures including labour cost + irrigation charges including labour cost + labour cost of weeding.

– Total cost = Fixed cost + variables cost

– Cost of production

$$\text{Cost of production} = \frac{\text{Cost of cultivation}}{\text{Total production}}$$

Returns :

$$GR = QP \times PP$$

where,

GR = Gross returns

QP = Quantity of product

PP = Price of product

Price of product was taken as the actual price at

which the produce was sold by the *Aloe vera* growers.

Net returns :

It is the residue after deducting all the cost and variable cost *i.e.* total cost from the gross returns.

$$\text{Net return} = \text{Gross return} - \text{Total cost}$$

Benefit : cost ratio (BCR) :

The benefit cost ratio (BCR) measures the returns or benefits per unit cost of investment. It is the ratio of sum of discounted value cash inflows to the sum of discounted value of the cash outflows.

$$\text{BCR} = \frac{\sum_{n=1}^t \frac{B_n}{(1+r)^n}}{\sum_{n=1}^t \frac{C_n}{(1+r)^n}}$$

where,

B_n = Benefit in each year

C_n = Cost in each year

t = Number of years

r = Discount rate.

Net present worth (NPW) :

It is sum of net returns discounted at base period.

$$\text{NPW} = \sum_{n=1}^t \frac{B_n}{(1+r)^n} - \sum_{n=1}^t \frac{C_n}{(1+r)^n}$$

where,

B_n = Benefit in each year

C_n = Cost in each year

t = Number of years

r = Discount rate.

Pay back period (PBP) :

It measures the length of time required to cover the initial outlay. The pay back was calculated successively deducting the initial investment by the undiscounted net returns until the initial investment is fully recovered.

$$P = \frac{I}{E}$$

where,

P = Payback period of the project in years

I = Investment of the project in rupees

E = Annual net cash revenue in rupees.

RESULTS AND DATA ANALYSIS :

The results obtained from the present investigation as well as relevant discussion have been summarized under following heads :

Cost of *Aloe vera* cultivation :

This has been achieved by studying in detail the investment incurred in establishment and maintenance cost of the *Aloe vera* crop. The economic viability of *Aloe vera* crop at farmer's field and college farm was tested with the help of the economic evaluation criteria

Table 1 : Establishment cost of <i>Aloe vera</i> on sample farms in Jaipur district						(Rs./ha)
Sr. No.	Particulars	Marginal	Small	Semi-medium	Medium	Overall
Operational cost						
1.	Land preparation	2569 (8.93)	2465 (8.50)	2493 (8.39)	2969 (8.78)	2543.93 (8.57)
2.	Planting material	12834 (44.61)	12631(43.65)	12949 (43.60)	13632 (43.21)	12947.58 (43.64)
3.	Planting cost	2931 (10.19)	3069(10.58)	3132(10.54)	3270(10.37)	3108.45(10.48)
4.	Irrigation charges	1039(3.80)	1093(3.77)	1121(3.77)	1197(3.79)	1114.2(3.75)
5.	Farm yard manure	1421(4.94)	1489 (5.13)	1503(5.06)	1587 (5.03)	1502.57(5.06)
6.	Weeding and hoeing	1568(5.45)	1634(5.63)	1661(5.59)	1698(5.38)	1645.94(5.55)
7.	Interest on working capital	2688.44(9.33)	2685.72(9.26)	2743.08(9.24)	2898.36(9.19)	2743.52(9.25)
	Total operational cost	25045.44(87.05)	25066.72(86.43)	25602.08(86.20)	27051.36(85.75)	25606.19(86.30)
Fixed cost						
8.	Interest on fixed capital	2329 (8.09)	2469 (8.51)	2538 (8.54)	2771 (8.78)	2528.7 (8.52)
9.	Depreciation	1357 (4.72)	1426 (4.92)	1522 (5.12)	1685 (5.34)	1496.28(5.04)
10.	Land revenue	40 (0.14)	40 (0.14)	40 (0.13)	40 (0.13)	40 (0.13)
	Total fixed cost	3726 (12.95)	3935 (13.57)	4100 (13.80)	4496 (14.25)	4064.99 (13.70)
	Total establishment cost	28771.44 (100.00)	29001.72 (100.00)	29702.08 (100.00)	31547.36 (100.00)	29671.16(100.00)

Figures in parentheses are the percentage of total establishment cost

viz., pay back period, benefit :cost ratio and net present worth.

This chapter has been divided into following three sections :

- Investment analysis under farmer's management.
- Investment analysis under college farm management.
- Economic viability of *Aloe vera* cultivation at farmer's field *vis-à-vis* college farm.

The costs incurred on *Aloe vera* cultivation have been classified into following two categories :

Establishment cost:

Aloe vera growers had to invest considerable amount on the establishment of *Aloe vera* in the initial years till they reached the first cutting. During this period, usually five years are commonly required. This period is known as gestation period. The investment made by the farmers in establishing the crop right from the pre-planting stage to the first cutting is termed as establishment cost. The cost of establishment of *Aloe vera* crop on different groups of farms was estimated by aggregating the cost of various items like land preparation, cost of suckers, plantation cost, farm yard manures, irrigation charges, weeding and hoeing etc. Since investment for establishing the *Aloe vera* crop continues for five consecutive years, various types of costs incurred in the establishment of *Aloe vera* crop on sample farms have been presented in Table 1.

The Table 1 reveals that on an average, the total cost per hectare for establishing *Aloe vera* crop was Rs. 29671.16. Total establishment cost was estimated to be Rs. 28771.44 per hectare on marginal, Rs. 29001.72 per hectare on small, Rs. 29702.08 per hectare on semi-medium and Rs. 31547.36 per hectare on medium farms Chand *et al.* (2002) and Shah and Zala (2007).

Of the total establishment cost, operational cost accounted for Rs. 25606.19 per hectare (86.30%). Remaining Rs. 4064.99 per hectare (13.70%) of total establishment cost was fixed cost.

Component wise, the cost of planting material was highest (43.64% of the total establishment cost) followed by planting cost (10.48%), interest on working capital (9.25%), land preparation (8.57%) weeding and hoeing (5.55%), farm yard manure (5.06% and irrigation charges (3.75%). Among different groups of farmers the share of planting material cost in the total establishment cost was 44.61, 43.65, 43.60 and 43.21 per cent on marginal, small, semi-medium and medium farmers, respectively

indicating decreasing share with the increase in the size of holding. Planting cost which stood second in order worked out to be 10.19, 10.58, 10.54 and 10.37 per cent on marginal, small, semi-medium and medium farmers, respectively with an overall average of 10.48 per cent. It was highest (Rs. 3270.00 per hectare) on medium farms and lowest Rs. 2931.00 per hectare on marginal farms. Expenditure on land preparation was another important component which accounted for 8.93, 8.50, 8.39 and 8.78 per cent on marginal, small, semi-medium and medium farms. Weeding and hoeing contributed 5.45, 5.63, 5.59 and 5.38 per cent to the total cost on marginal, small, semi-medium and medium farms, respectively. Expenditure on farm yard manure was worked out to be 4.94, 5.13, 5.06 and 5.03 per cent on marginal, small, semi- medium and medium farms, respectively of the total establishment cost. Expenditure on irrigation charges was worked out to be 3.80, 3.77, 3.77 and 3.79 per cent of the total establishment cost on marginal, small, semi-medium and medium farms, respectively. Interest on working capital accounted for 9.33, 9.26, 9.24 and 9.19 per cent on marginal, small, semi-medium and medium farms, respectively. interest on fixed capital accounted for 8.52 per cent followed by depreciation (5.04%) and land revenue (0.13%).

In sum, it may be concluded that total cost of establishing *Aloe vera* crop in the study area was estimated to be Rs. 29671.16 per hectare. As regards the various components of the cost, the cost of planting material formed the single largest cost item of *Aloe vera* crop. Planting cost, interest on working capital, land preparation, weeding and hoeing, farm yard manure, irrigation charges and depreciation were the other major components of establishment cost sharing 10.48, 9.25, 8.57, 5.55, 5.06, 3.75 and 5.04 per cent, respectively.

Maintenance cost :

Table 2 reveals that, on an average the total cost per hectare for maintenance of *Aloe vera* crop was estimated to be Rs. 10082.55. Under maintenance cost, total operational and fixed costs were worked out to be Rs. 8799.28 (87.27 % of total maintenance cost) and Rs. 1283.6 (12.73% of total maintenance cost), respectively. Total maintenance cost was estimated to be Rs. 9003.88 per hectare on marginal, Rs. 9710.96 per hectare on small, Rs. 10034.72 per hectare on semi-medium and Rs. 11665.2 per hectare on medium farms. Thus, the total cost of maintenance was highest on

medium farms followed by semi-medium, small and marginal.

Component wise, the cost of harvesting was the highest (39.57% of the maintenance cost) followed by transportation (19.97%), weeding and hoeing (10.51%), irrigation charges (7.87%). Among different groups of farms the share of transportation cost in the total maintenance cost was 20.42, 20.52, 20.46 and 18.11 per cent on marginal, small, semi-medium and medium farms,

respectively with an overall average of 19.97 per cent. It was highest (Rs. 2113 per hectare) on medium farms and lowest (Rs. 1839.00 per hectare) on marginal farms. Weeding and hoeing cost worked out to be 10.35, 11.21, 10.35 and 9.70 per cent of the total maintenance cost on marginal, small, semi-medium and medium farms, respectively with an overall average of 10.51 per cent. It was highest (Rs. 1131.00 per hectare) on medium farms and lowest (Rs. 932.00 per hectare) on marginal farms.

Table 2 : Maintenance cost of *Aloe vera* on sample farms in Jaipur district

Sr. No.	Particulars	Marginal	Small	Semi-medium	Medium	(Rs./ha) Overall
Operational cost						
1.	Weeding and hoeing	932 (10.35)	1089 (11.21)	1039 (10.35)	1131 (9.70)	1059.1 (10.51)
2.	Irrigation charges	668 (7.42)	721 (7.42)	851 (8.48)	921 (7.90)	793.94 (7.87)
3.	Harvesting	3635 (40.37)	3781(38.94)	3839 (38.26)	4920 (42.18)	3989.69 (39.57)
4.	Transportation	1839 (20.42)	1992 (20.52)	2052 (20.46)	2113 (18.11)	2013.78 (19.97)
5.	Interest on working capital	848.88 (9.43)	909.96 (9.37)	933.72(9.30)	1090.2 (9.34)	942.78 (9.35)
	Total operational cost	7922.88 (87.99)	8492.96 (87.46)	8714.72 (86.85)	10175.2 (87.23)	8799.28 (87.27)
Fixed cost						
6.	Interest on fixed capital	603 (6.70)	689 (7.10)	732 (7.29)	812 (6.96)	714.42 (7.08)
7.	Depreciation	468 (5.20)	519 (5.34)	578 (5.76)	668 (5.73)	559.19 (5.55)
9.	Land revenue	10 (0.11)	10 (0.10)	10 (0.10)	10 (0.08)	10 (0.10)
	Total fixed cost	1081 (12.01)	1218 (12.54)	1320 (13.15)	1490 (12.77)	1283.6 (12.73)
	Total maintenance cost	9003.88 (100.00)	9710.96 (100.00)	10034.72 (100.00)	11665.2 (100.00)	10082.55 (100.00)

Figures in parentheses are the percentage of total maintenance cost

Table 3 : Total cost of *Aloe vera* on sample farms in Jaipur district

Sr. No.	Particulars	Marginal	Small	Semi-medium	Medium	(Rs./ha) Overall
Operational cost						
1.	Land preparation	2569(6.80)	2465(6.37)	2493(6.27)	2769(6.41)	2543.93(6.40)
2.	Planting material	12834(33.97)	12631(32.63)	12949(32.59)	13632(31.55)	12947.58(32.57)
3.	Planting cost	2931(7.76)	3069(7.93)	3132(7.88)	3270(7.57)	3108.45(7.82)
4.	Irrigation charges	1707(4.52)	1814(4.69)	1972(4.96)	2118(4.90)	1908.14(4.80)
5.	Farm yard manure	1421(3.76)	1489(3.85)	1503(3.78)	1587(3.67)	1502.57(3.78)
6.	Weeding and hoeing	2500(6.62)	2723(7.03)	2700(6.79)	2829(6.55)	2705.04(6.80)
7.	Harvesting	3635(9.62)	3781(9.77)	3839(9.66)	4920(11.38)	3989.69(10.04)
8.	Transportation	1839(4.87)	1992(5.15)	2052(5.16)	2113(4.89)	2013.78(5.07)
9.	Interest on working capital	3537.32(9.36)	3595.68(9.29)	3676.8(9.25)	3988.56(9.23)	3686.3(9.27)
	Total operational cost	32968.32(87.27)	33559.68(86.69)	34316.8(86.36)	37226.56(86.15)	34405.47(86.55)
Fixed cost						
10.	Interest on fixed capital	2932(7.76)	3158(8.16)	3270(8.23)	3583(8.29)	3243.12(8.16)
11.	Depreciation	1825(4.83)	1945(5.02)	2100(5.28)	2353(5.45)	2055.47(5.17)
12.	Land revenue	50(0.13)	50(0.13)	50(0.13)	50(0.11)	50(0.13)
	Total fixed cost	4807(12.73)	5153(13.31)	5420(13.64)	5986(13.85)	5348.59(13.45)
	Total cost	37775.32(100.00)	38712.68(100.00)	39736.8(100.00)	43212.56(100.00)	39753.71(100.00)

Figures in parentheses are the percentage of total cost

Expenditure on irrigation charges was accounted for 7.42, 7.42, 8.48 and 7.90 per cent of the total maintenance cost on the marginal, small, semi-medium and medium farms with an overall average of 7.87 per cent. The expenditure on interest on working capital is worked out to be 9.43, 9.37, 9.30 and 9.34 per cent of the total maintenance cost on marginal, small, semi-medium and medium farms with an overall average of 9.35 per cent. Interest on fixed capital accounted for 7.08 per cent share in the total fixed cost of maintenance of *Aloe vera* crop followed by depreciation (5.55%) and land revenue (0.10 %).

Total cost :

The total cost was calculated to be Rs. 39753.71 per hectare of which operational cost accounted for Rs. 34405.47 per hectare (86.55 % of total cost) and fixed cost accounted for Rs. 5348.59 per hectare (13.45% of total cost). on the basis of farm size the total cost worked out to be Rs. 3775.32, 38712.68, 39736.8 and 43212.66 per hectare on marginal, small, semi-medium and medium farms, respectively which is given in Table 3.

Investment analysis under college farm management :

Various parameters to test the project viability were used. Similar to farmers' field the cost of *Aloe vera* cultivation on college farm was divided into two parts *i.e.* establishment cost and maintenance cost. the cost of college farm has been estimated in two ways (i) without salary (ii) with salary.

Establishment cost :

The details of establishment cost of college farm are given in Table 4. The establishment cost was further presented as establishment cost without salary and establishment cost with salary. The establishment cost comprised two types of costs *i.e.* variable cost and fixed cost. the total establishment cost without salary was Rs. 42918.32 per hectare. Out of this, the operational cost amounted to be Rs. 36972.32 per hectare (86.15% of total establishment cost without salary) and fixed cost amounted to be Rs. 5946.00 per hectare (13.85% of total establishment cost without salary).

In the operational cost, the cost required for planting material was Rs. 18920 per hectare (44.08%) followed

Table 4 : Establishment cost of *Aloe vera* on college farm in Jaipur district

Sr. No.	Particulars	Cost (Rs./ha)	Percentage of cost from total establishment cost without salary	Percentage cost from total establishment cost with salary
Operational cost				
1.	Land preparation	3871	9.02	4.03
2.	Planting material	18920	44.08	19.68
3.	Planting cost	4469	10.41	4.65
4.	Irrigation charges	1312	3.06	1.36
5.	Farm yard manure	2112	4.92	2.20
6.	Weeding and hoeing	2327	5.42	2.42
7.	Interest on working capital	3961.32	9.23	4.12
	Total operational cost	36972.32	86.15	38.46
Fixed cost				
8.	Interest on working capital	3687	8.59	3.83
9.	Depreciation	2219	5.17	2.31
10.	Land revenue	40	0.10	0.04
11.	Salary for permanent staff	53204.83	-	55.35
Total fixed cost				
	Without salary	5946.00	13.85	-
	With salary	59150.83	-	61.54
Total establishment cost				
	Without salary	42918.32	100.00	-
	With salary	96123.15	-	100.00

by planting cost Rs. 4469 (10.41%), interest on working capital Rs. 3961.32 (9.23%), land preparation Rs. 3871 (9.02%), weeding and hoeing Rs. 2327 (5.42%), farm yard manure Rs. 2112 (4.92%) and irrigation charges Rs. 1312 (3.06%). Out of total fixed cost, the interest on fixed capital was Rs. 3687 (8.59%) followed by depreciation Rs. 2219 (5.17%) and land revenue Rs. 40 (0.10% of total establishment cost without salary). The total establishment cost with salary was estimated to be Rs. 96123.15 per hectare, the percentage share of operational cost in it was estimated only 38.46 per cent. Out of this, cost for planting material was 19.68 per cent followed by planting cost (4.65%), interest on working capital (4.12%), land preparation (4.03%), weeding and hoeing (2.42%), farm yard manure (2.20%) and irrigation charges (1.36%). The total fixed cost with salary accounted for Rs.59150.83 (61.54% of total establishment cost with salary). The table revealed that the salary of technical staff accounted for Rs. 53204.83 (55.35% of total establishment cost with salary). The share of interest on fixed capital, depreciation and land revenue in total establishment cost with salary was 3.83 per cent, 2.31 per cent and 0.04 per cent, respectively.

Maintenance cost :

Aloe vera cultivators have to incur expenditure on

maintenance of the crop every year. Like establishment cost, maintenance cost was also divided into maintenance cost without salary and maintenance cost with salary and these comprised two cost *i.e.* variable cost and fixed cost.

The Table 5 revealed that the total maintenance cost without salary and total maintenance cost with salary accounted for Rs. 11120.52 and 28255.73, respectively. Out of total maintenance cost without salary, total operational cost was found to be Rs. 9543.52 (85.82%). Out of total operational cost the cost of harvesting accounted for Rs. 4369 (39.29 % of total maintenance cost without salary) followed by transportation cost Rs. 2198 (19.77 % of total maintenance cost), weeding and hoeing Rs. 1117 (10.05 %) interest on working capital Rs. 1022.52 (9.19%) and irrigation charges Rs. 837 (7.53%) per hectare.

The Table 5 shows that the fixed cost without salary accounted for Rs. 1577 (14.18% of total maintenance cost without salary). Of this highest share charged by interest on fixed capital was Rs. 899 per hectare (8.08% followed by depreciation Rs. 668 (6.07%) and land revenue Rs. 10 (0.10% of total maintenance cost without salary).

The maintenance cost with salary was found to be Rs. 28255.73. In this, share of operational cost compared

Table 5 : Maintenance cost of *Aloe vera* on college farm in Jaipur district

Sr. No.	Particulars	Cost (Rs./ha)	Percentage of cost from total maintenance cost without salary	Percentage cost from total maintenance cost with salary
Operational cost				
1.	Weeding and hoeing	1117	10.05	3.95
2.	Irrigation charges	837	7.53	2.96
3.	Harvesting	4369	39.29	15.46
4.	Transportation	2198	19.77	7.78
5.	Interest on working capital	1022.52	9.19	3.62
	Total operational cost	9543.52	85.82	33.78
Fixed cost				
6.	Interest on fixed capital	899	8.08	3.18
7.	Depreciation	668	6.07	2.36
8.	Land revenue	10	0.10	0.03
9.	Salary for permanent staff	17135.21	-	60.64
Total fixed cost				
	Without salary	1577	14.18	-
	With salary	18712.21	-	66.22
Total maintenance cost				
	Without salary	11120.52	100.00	-
	With salary	28255.73	-	100.00

to share of operational cost in total maintenance cost without salary was low. The cost of harvesting was estimated to be 15.46 per cent of total maintenance cost with salary followed by transportation charges (7.78%), weeding and hoeing (3.95%), interest on working capital (3.62%) and irrigation charges (2.96%). The total fixed cost with salary accounted for Rs. 18712.21 (66.22% of total maintenance cost with salary). The lion's share was taken by the salary for technical staff which accounted for Rs. 17135.21 (60.64 % of total maintenance cost with salary), followed by interest on fixed capital (3.18%), depreciation (2.36%) and land revenue (0.03%).

Total cost :

The Table 6 shows that total costs (establishment + maintenance) without salary and with salary on college farm of the order of Rs. 54038.84 per hectare and Rs. 124378.88 per hectare, respectively. Out of total cost without salary, the operational cost and fixed cost accounted for Rs. 46515.84 per hectare (86.08%) and Rs. 7523 per hectare (13.92%), respectively. The highest share was charged by planting material Rs. 18920 (35.01%) followed by interest on working capital Rs. 4983.84 (9.22%), interest on fixed assets Rs. 4586 (8.49%), planting cost Rs. 4469 (8.27%), harvesting Rs.

Table 6 : Total cost of *Aloe vera* on college farm in Jaipur district

Sr. No.	Particulars	Cost (Rs./ha)	Percentage of cost from total cost without salary	Percentage cost from total cost with salary
Operational costs				
1.	Land preparation	3871	7.16	3.11
2.	Planting material	18920	35.01	15.21
3.	Planting cost	4469	8.27	3.59
4.	Irrigation charges	2149	3.98	1.73
5.	Farm yard manure	2112	3.90	1.70
6.	Weeding and hoeing	3444	6.37	2.77
7.	Harvesting	4369	8.08	3.51
8.	Transportation	2198	4.07	1.77
9.	Interest on working capital	4983.84	9.22	4.01
	Total operational cost	46515.84	86.08	37.40
Fixed cost				
10.	Interest on fixed capital	4586	8.49	3.69
11.	Depreciation	2887	5.34	2.32
12.	Land revenue	50	0.09	0.04
13.	Salary for permanent staff	70340.04	-	56.55
Total fixed cost				
	Without salary	7523	13.92	-
	With salary	77863.04	-	62.60
Total cost				
	Without salary	54038.84	100.00	-
	With salary	124378.88	-	100.00

Table 7 : Comparative economic viability between farmers' fields and college farm

Sr. No.	Parameters of evaluation technique	Farmers field	College farm	
			Without salary	With salary
1.	Discounted cost (Rs./ha)	35380.80	48094.56	110697.20
2.	Discounted return (Rs./ha)	69146.90	78137.68	78137.68
3.	Benefit : cost (B:C)	1.95	1.62	0.70
4.	Net present worth (NPW) (Rs./ha)	33766.10	30043.12	-32559.52
5.	Pay back period (PBP)	2.2 years	2.10 year	-

4369 (8.08%), land preparation Rs. 3871 (7.16%) and weeding and hoeing Rs. 3444 (6.37%). The total cost with salary also comprised operational cost and fixed cost, which accounted for Rs. 46515.84 (37.40%) and Rs. 77863.04 per hectare (62.60% of total cost with salary), respectively. Amongst the various cost items of total cost with salary per hectare, salary of permanent staff was the major cost component while accounted for Rs. 70340.04 per hectare (56.55% of total cost with salary).

Economic viability of *Aloe vera* cultivation at farmer's field vis-à-vis college farm :

The economic viability test of the *Aloe vera* cultivation was designed to aid the decision maker in deciding whether or not the economic benefits that occur from an investment were at least as high as the cost involved in the investment. The investment analysis helps in assigning the economic viability of investment under consideration for deciding whether or not the investment should be made.

In order to assess the capital productivity for both farmers field and college farm *Aloe vera* cultivation, the costs and benefits were discounted at the prevailing bank interest rate of 12 per cent. The different techniques were used for finding comparative economic viability of *Aloe vera* cultivation between farmer's field and college farm. Further the comparative viability of *Aloe vera* cultivation was analysed by working out three different methods viz., pay back period, net present worth and benefits cost ratio. These are presented in Table 7. Doke (2002); Dwivedi and Singh (2010); Pawar and Hange (2008); Ram *et al.* (2012); Shah and Tripathi (2009) and Sharma(1997).

Pay back period :

As the name suggested it is defined as the time period within which the initial investment of project recovered in the form of yearly benefits. The pay back period of investment for *Aloe vera* cultivation on farmer's field was worked out to be 2.2 years. the pay back period of *Aloe vera* cultivation on college farm was found to be 2.10 years when salary for permanent staff was not considered as cost and no pay back period was found if salary for permanent staff was considered as part of cost on college farm.

Benefit : cost ratio :

B:C ratio is the ratio between the present value of

net cash inflows and present value of net cash out flows. The B:C ratio must be more than or at least equal to unity. On the basis of available data it was calculated as 1.95 for *Aloe vera* cultivation on farmer's field. This meant that an investment of Rs. 1 yielded Rs. 1.95 for *Aloe vera* crop. This indicated more than unity. It is also more than unity for *Aloe vera* cultivation on college farm when salary is not taken as a cost of production. The B:C ratio without salary and B:C ratio with salary were found to be 1.62 and 0.70, respectively.

Net present worth :

The net present worth of *Aloe vera* cultivation for farmer's field of study area was estimated as Rs. 33766.10 per hectare. On the basis of this, the total discounted costs and total discounted returns were observed as Rs. 35380.80 per hectare and Rs. 69146.90 per hectare, respectively. Hence, the net present worth indicated that the nature of the investment by the farmer was on the right direction and found to be positive with the gap of Rs. 33766.1 per hectare as benefit. It was positive at college farm under this condition of without salary (Rs. +30043.12) and was estimated to be negative (Rs. -32559.52). More or less similar results were obtained by Chanwaria, 1984 in chetirose, Jadhav *et al.*, 2001 isabgoal and patchouli, Jarial, 1999 safed musali, Kareemulla *et al.*, 2007, gooseberry-aonla, Farooqi and Vasundhara, 1997 and Suneetha, 1998 on medicinal plants, Farooqi *et al.*, 2001 patchouli, Sharma and Thakur, 1988 studied on economics of commercial crops in Himachal Pradesh and Kanaujia *et al.*, 2009 studied on productivity and profitability of agri-horti system in sub-tropical region.

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LITERATURE CITED :

- Chand, K., Jangid, B.L. and Gajja, B.L. (2002). Cost of cultivation and cost production in the marketing of Heena in Pali district. *Ann. Arid Zone*, **41** (2) : 175-181.
- Chanwaria (1984). Studies and survey of cultivation of chetirose (*Rosa damaseena* Mill) in Haldighati and Khamnor region. M.Sc. (Ag.) Economics Thesis, Rajasthan Agricultural University, Campus, Udaipur, RAJASTHAN (INDIA).
- Doke (2002). Economics of production and marketing of

- fenugreek. *Indian J. Agric. Mktg.*, **16** (2) : 69.
- Dwivedi, Sudhaker and Singh, Tarunvir (2010). An analytical economics of saffron cultivation in Jammu and Kashmir. *J. Hill Agric.*, **1** (2): 168-171.
- Farooqi, A.A. and Vasundhara, M. (1997). Medicinal plants : Wealth for farmers and health for all. *Farm Digest*, pp. 2-11.
- Farooqi, A.A., Vasundhara, M. and Srinivasrappa, K.N. (2001). Patchouli cultivation as an intercrop in plantations in : National Seminar on transfer of technology of medicinal and aromatic crops, held at Bangalore, 20-22 Feb. pp. 182-188.
- Jadhav, M.S., Pargi, B.V. and Vaidkar, R.D. (2001). Production and marketing of isabgoal (Herbs) and patchouli (grass) in Maharashtra. National Research Seminar on herbal conservation, cultivation, marketing and utilization with special emphasis, on Chattisgarh the herbal state, Raipur, Chattisgarh, pp. 93.
- Jarial, G.S. (1999). High value farming safed musali or senna. *National Bank News Review*, **15** : 16-23.
- Kanaujia, V.K., Choudhary, H.P., Kumar, K. and Verma, M. (2009). Productivity and profitability of agri-horti system in sub-tropical region. *Curr. Adv. Agric. Sci.*, **1** (1): 38 - 40.
- Kareemulla, K., Tewari, R.K., Singh, B. and Kumar, Kuldeep, (2007). Production and marketing of Indian gooseberry-onla (*Emblicoffcinalis* Gaertn.) in Pratapgarh district of Uttar Pradesh. *Indian J. Agric. Mktg.*, **21** (2) : 39-45.
- Pawar, B.N. and Hange, D.S. (2008). Economics of production and marketing of selected medicinal and aromatic plants in western Maharashtra. *Indian J. Agric. Mktg.*, **22** (3) : 128 - 132.
- Ram, S., Kumar, S., Singh, V., Ram, P., Tomar, V.K.S. and Singh, A.K. (2012). Economics of production to marketing of aromatic crops in Uttar Praesh. *Agric. Econ. Res. Rev.*, **25** (1): 157-160.
- Shah, Ajazahmad and Tripathi, Raj Bahaur (2009). Economics analysis of saffron production in Kashmir Valley. *Res. Article Agric.*, **4** (3) : 277-279.
- Shah, S.P. and Zala, C. (2007). Cost benefit analysis of ginger cultivation in middle Gujarat. *Indian J. Hort*, **43** (1) :1-9.
- Sharma, H.R. and Thakur, D.R. (1988). Comparative economics of commercial crops in Himachal Pradesh. *Agric. Situ in India*, **43** (7) : 579.
- Sharma, P. (1997). An economic analysis of production and marketing of seasonal flowers in Jaipur district of Rajasthan. M.Sc. (Ag.) Agril. Economics Thesis, Rajasthan Agricultural University, Campus, Jobner, RAJASTHAN (INDIA).
- Suneetha, M.S. (1998). Demand and valuation of medicinal plants and produces in the western ghats of Kerala. A resource economics study. M.Sc (Ag.) Thesis, University of Agriculture Sciences, Bangalore, KARNATAKA (INDIA).

