Journal of Crop and Weed 4(2) : 24-30(2008)

A study on structure of costs and returns of pineapple cultivation in Darjeeling district of West Bengal

A. JHA CHAKRABORTY AND B. BERA

Department of Agricultural Economies,
Bidhan Chandra Krishi Viswavidyalaya
Mohanpur 741252, Nadia, West Bengal, India

ABSTRACT

The present study was conducted in purposively selected two villages of Phansideoa block of Siliguri subdivsion of Darjeeling district of West Bengal. The study revealed that total cost of cultivation, total return, net return over cost C per acre were of the tune of Rs. 119104.23, Rs. 149750.62 and Rs. 30646.30 respectively and return- cost ratios estimated at subsequent stages were of the order of 1.64, 1.57, 1.29 and 1.26 when all sample farmers were taken together. Net return would have been greater if it was estimated by applying prime cost concept of cost of cultivation. Inter-farm size comparison in terms of different cost concepts revealed that there was an increasing trend with the increase in farm size, but the net return over different cost concepts used in the study and return-cost ratios were found to have decreased with the increase of farm size at subsequent stages of estimation of those parameters. Although, the crop created an employment opportunity of 153 man days, there is a tremendous possibility of creating more job opportunities directly or indirectly if marketing and processing activities were taken into account and at the same time, it will help pineapple growers to get remunerative prices for their produce

Key words : Cost A_1, cost A_2, cost B, cost C, prime cost, return-cost ratio.

Pineapple (*Ananus comesus*), an important commercial fruit crop, is a rich source of vitamin A, B and C and also contains a large number of nutrients essential for human health. Besides this, a large number of value added products like, jam, jelly mixed jam etc. can be produced, which will provide remunerative prices to the farming community in a sustainable manner and also will generate employment opportunity for unemployed rural people, Considering the economic importance of the crop, Government of India has sanctioned one out of the ten Agricultural Export Zone (AEZ) for pineapple for all-round development of the pine apple producing areas. Pineapple, generally, favours humid tropical climatic with sandy loam soil texture for production of maximum quality fruits, but it can also be cultivated successfully in areas having annual rainfall ranging between 100 – 150 cm.and medium rainfall areas having In West Bengal, it is the third important fruit crop in terms of area coverage and production after mango and banana. Although, the crop grows well in all the districts of West Bengal, it is the Darjeeling district of this state, which has the highest area under the crop and production during the period 2004-05. During this period in Darjeeling district of this state, the crop covered an area of 3.39 thousand ha., which was estimated to be 30.77 per cent of the total area under the crop in West Bengal and produced 104.03 thousand tones comprising 29.74 percent of the total state production. There is enormous commercial potentiality of the crop in improving the economic condition of the regions. Hence, the commercial importance of the crop, the present study has been undertaken to study the costs and return structure of the pineapple cultivation in the plains of Darjeeling District of West Bengal. The specific objectives are:

a) To estimate the percentage share of area under pineapple of the total operational holding size of the sample farmers classified according to their size of holdings,
b) To examine total cost of cultivation per unit area for different size group of sample farmers;
c) To workout total return, net return and return cost-ratios for different farm size groups ;
d) To find out the extent of human labour requirement for performing different operations of pineapple cultivation in the study area.

MATERIALS AND METHODS

The study was based on primary data collected from two villages selected purposively from Phansedeoa block of Siliguri sub-division of Darjeeling district of West Bengal. From these two villages, a total of 50 sample pineapple growers were selected randomly, 25 from each village, for collection of necessary information regarding cost, returns, labour requirement etc. through pre-tested schedule following personal interview method. For inter- class comparison of total cost, total return, net return,

return – cost ratio etc. the sample farmers were classified into four (4) groups depending on the size of their total operational holdings. The first group was composed of farmers having operational holding less than or equal to 2 acres, farmers with holding size ranging between 2-4 acres formed the second farm size group, the third group of farmers have operational holding size varying between 4-6 acres and farmers having operational holding above 6 acres constituted the fourth group. For estimation of total cost of cultivation, the concept used in farm management practices was employed. Prime cost concept (Panse and Vokil,1966) which includes all out of pocket costs minus land cess and revenue plus imputed value of family labours is generally used in estimating cost of cultivation for seasonal and annual crops. Agriculture in India being largely dependent on nature, no farmer can expect to cover the total cost, *i.e.* cost C (Mukhopadhyay, 1990). So, estimation of cost of cultivation by using farm management concept may seem to be unrealistic. But pineapple, being a commercial crop, it should be treated by business like concept taking into account of returns of labours in the farm of imputed value of family labours, interest on working capital and imputed rental value of owned land (Kahlon and Singh, 1981). So, the cost concept used in the present study is as follows **:**

Cost A_1 = Value of all out of pocket costs + interest on working capital+ depreciation of machines and implements

Cost A_2 = Cost A_1 + rental value of leased- in land

Cost B = Cost A_2 + imputed rental value of owned land; In the present study

Cost C = Cost B+ imputed value of family labour

In the present study, cost C had been treated taken as total cost of cultivation of pineapple per acre. Again, cost of products of one pineapple was worked out by dividing total cost of cultivation per acre by number of fruits produced in one acre of land. For cost of cultivation estimation due attention had also been paid to the nature of crop because this crop required 18 months from the date of transplanting to become ready for harvest. The study was pertaining to the period 2004 – 2005.

RESULTS AND DISCUSSION

At the out set, we have classified the total sample farmers into four different farm size group depending on the size of their total operational holdings and estimated the percentage share of area under pineapple of the total holding size of the respective group of farmers (Table 1). The table revealed that 40 per cent of the sample farmers had operational holding size less than or equal to 2 acres and 66 percent of the sample farmers had holding size less than 4 acres i.e. two – third of the sample farmers belonged to farm size group having land area less than four (4) acres and one – third farmers had land area exceeding 4 acres. That is, in the study area, small and marginal farmers were found to be preponderant. The table also revealed that the area under pineapple increased with the increase in operational holding sizes except in case of third group of farmers where it is actually declined. But strikingly, the share of area under pineapple as a percentage of total holding had witnessed a deceleration with the increase in land area i.e. farmers with small operational holding size allotted higher percentage of area to pineapple than those with larger holding size. The study also revealed that farmers of the study region allocated 66.77 per cent of their holding size to pineapple but it was the first group of farmers who allocated highest (91.61%) percentage of land to pine apple followed by second group (76.41%), third group (69.51%) and fourth group of sample farmers (59.84) i.e. their was a declining trend in allocation of land to pineapple when expressed as a percentage of total holding of the respective groups.

Cost of cultivation: Cost A_1

Cost A_1 included the values of all variable inputs used in pineapple cultivation including interest on working capital. Depreciation of machinery and implements used had not taken into account in the estimation of cost A_1 on account of their smallness in magnitude (Table 2). The volume of out of pocket costs was found to be Rs. 91243.20 per acre when all the sample farmers were taken into account. The table also revealed that there was an increasing trend of cost A_1 with the increase of land holding sizes which may be due to higher expenditure on costly inputs purchased from market by the farmers belonging to higher farm size groups and lesser use of less costly inputs as compared to other counter part comprising marginal and small farmers .The amount of cost A_1 for different farm size groups was of the order of Rs. 95433.02, Rs. 91157.12, Rs. 87501.78 and Rs. 86177.3 per acre for fourth, third, second and first group respectively. The examination of percentage contribution of different

cost components to cost A_1 revealed that cost of planting materials (suckers) made the highest contribution to cost A_1 which was observed to be 39.71 per cent of cost A_1 followed by cost of fertilizer (30.59%) when farmers belonging to all size group were taken together. Another observation was that farmers having small holding size applied higher quantity of comparatively less costly inputs which were mainly supplied from farm households (e.g. manure, bullock labour, planting materials, family labours etc.) and less of costly inputs which have to be purchased from market through cash payment and the trend was found to be reverse for the farmers having large operational holding size. The highest amount of cost A_1 was incurred by the farmers having holding size above 6 acres which was estimated to be Rs. 95433.02 per acre followed by second farm size group of farmers (Rs. 91157.12) and subsequently followed by third group (Rs. 87501.78) and first group of farmers (Rs. 8617.3).

Estimation of cost A_2

According to the cost concept used in the study, cost A_2 was obtained by adding rental value of leased in land to cost A_1 (Table –3). The table showed that only first two groups of farmers having holding size less than four (4) acres had taken some land leased in on the basis of some mutually agreed upon contracts of payment of some fixed cash amount which resulted an increased in the cost of cultivation for these two groups of farmers. The farmers who leased out may be either marginal or small farmers who had no fund required for cultivation of pineapple or some large land owners who found it difficult to manage the crop. As the tenants needed to pay a fixed amount to land owners as rent for getting use right of the land, the amount of cost A_2 was found to have increased to Rs. 95522.42 per acre. It was observed to be the highest (Rs. 98480.48 per acre for second group of farmers followed by farmers (Rs. 96434.60 per acre) belonging to first group of farmers.

Estimation of cost B

By adding rental value of owned land to cost A_2, the cost B per acre for cultivation of pineapple (Table-3) was derived. Actually this component of cost B was treated as opportunity cost of the owners operated land as the land owners had sacrificed the rental value of that land from which they could have earned some amount by leasing out land to tenants, hence, it was considered as cost to land owners and added to cost A_2 to estimate cost B. This concept used in estimation of cost of cultivation seemed rational as the crop was cultivated with business motive. Although, the addition of this component to costA_2 had increased the total cost of cultivation which ultimately resulted in deceleration of net return per acre. The table also revealed that the cost B had increased with the increase in operational holding size in absolute monetary terms. The Cost B per acre was found to be higher in case of (Rs. 120789.00) fourth group of farmers and the lowest (Rs. 108645.20) for first group of farmers. The percentage contribution of this component to cost B was observed to be vary between 11 to 20.

Estimation of cost C

The total cost of cultivation i.e.cost c was estimated by adding imputed value of family labour employed during cultivation of pineapple (Table –3). Here again, the imputed value of family labour was the opportunity cost of family labour as they had sacrificed wage which they could have earned by selling services abour services to elsewhere and hence, it was treated as cost for owner operated farm. The imputed value of family labour was calculated by multiplying the numbers of mandays with market wage rate prevailing at that time in the study area. From this table it was clear that the total cost of cultivation i.e. cost C, exhibited the same trend as that of cost A1, cost A2 and cost B, and increased with the increase of holding size, although the inter – group differences were found not to be significant. Again, the percentage contribution of this component to cost C was observed to have declined with the increase in holding size due to the high dependence of small and marginal farmers on family labour and vice-versa. Although, inclusion of this component has further dipped down the net return per acre but from commercial point of view it seemed rational. The magnitude of total cost of cultivation i.e. cost C per acre, was observed to be the highest (Rs. 123153.80) for the fourth group of farmers followed by third group (Rs. 118361.00) and subsequently followed by second group (Rs. 115638.03) and first group of farmers (Rs. 114773.70).

Estimation of total return

Total return per acre was estimated by adding values of main products (fruits) to the values of by products i.e. suckers used as planting materials for

the next season (Table –4). The table revealed that total return showed an increasing trend with the increase in operational holding across the groups. The total return realized by farmers belonging to all farm size group was estimated to be Rs. 149750.62 per acre and it was the highest (Rs. 157633.87) for the fourth group of farmers and the lowest (Rs. 1373700.00) for the first size group of farmers, although, the first group of farmers had received the highest amount of return from by – products may be due to use of higher quantity of planting materials (table–2) which enabled them to earn highest amounts of returns from suckers per acre followed by fourth group of farmers (Rs. 13121.03)

Estimation of net returns and return cost ratios

Now, return which is the difference between total return and total cost estimated along with return –cost ratio over different cost concept for different farm size groups in order to compare relative profitability among different farm size groups (Table 5). The table revealed that return per acre over out of pocket cost i.e. cost A, was estimated to be Rs. 58507.41 with return – cost ratio 1.64 when all sample farmers were taken together. The table also indicated that returns per acre over different cost concepts i.e., cost A_2, cost B and cost C were of the tune of Rs. 54228.26, Rs. 34278.40 and Rs. 30646.39 and the return cost ratios were of the order of 1.57, 1.29 and 1.26 respectively. Summarily, the volume of return per acre over different cost concepts and return cost ratios were found to have decreased in subsequent stages due to increase of volume of cost at each stage.

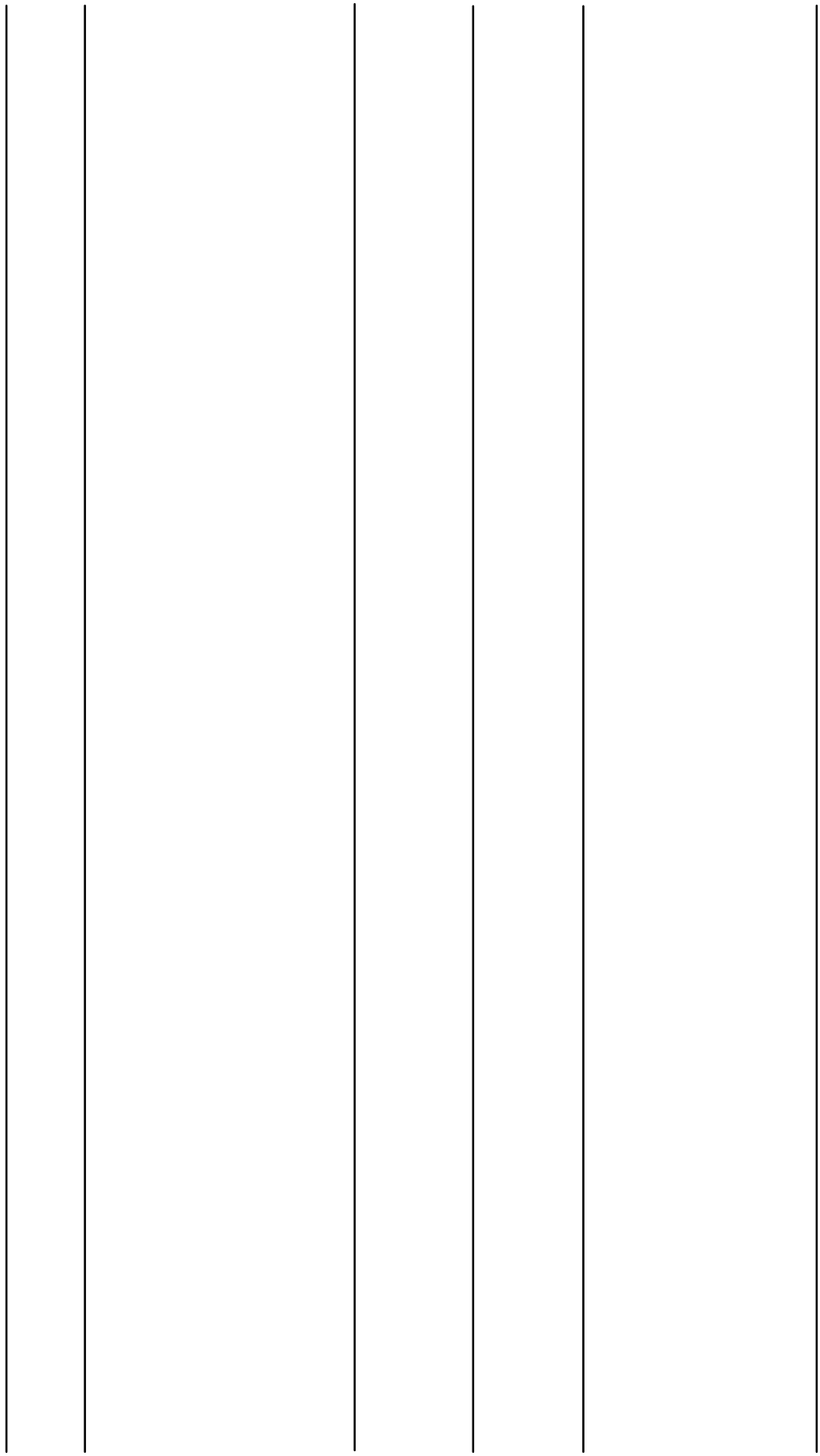
Inter-group comparison of return per acre over different cost concept used in the study and also the return-cost ratios indicated that the values of these parameters have witnessed an acceleration with the increase in operation holding size i.e. there was an increasing trend of return per acre across the farm size groups over different cost concepts and the values of return – cost ratios showed similar trend as that of net returns per acre. The table also revealed that the cost of production of pine apple was worked out to be Rs. 6.92 per fruit when all farm size classes were taken together and it showed an increasing trend across the farm size group, although cost of production of fruits varied significantly among the groups i.e. the production cost per piece pineapple varied between Rs. 6.59 to Rs. 7.20 (difference was only Rs. 0.72 among groups).

Operation–wise human labour distribution

Operation- wise labour distribution for different size groups of farmers indicated that the labour requirement per acre for cultivation of pineapple was 156 of which the contribution of hired labour was found to be 69.23 percent and family labour constituted 30.71 percent of the total labour requirement when all sample farmers were taken together. Total labour requirement was observed to be higher for fourth farm size group of farmers which might be due to their more dependence on hired labours. This was followed by farmers belonging to third farm size group who employed a total of 153 labours of which 105 were hired and 48 labours were supplied by the farm households. The table also revealed that farmers with larger operational holding size had employed larger number of hired labours and less of family labour whereas the case was reverse for small and marginal farmers who employed more of family labours and less of hired labours. Operation wise distribution of total labours showed that harvesting of matured pineapple required the highest (59 mandays) number of labours when all sample farmers were taken together followed by transplanting of suckers and subsequently followed by intercultural operations, which required 20.51 percent and 18.59 percent of the total labour requirement for cultivation of pineapple per acre respectively. So, the cultivation of pineapple was

Table 1. Distribution of sample farmers in different size groups classified according to their operational holding size. (Area in Acres)

Sl. No.	Farm size group	Number of farmers	Percentage to total sample farmers	Total operational holding	Area under pineappele cultivation	Percentage to total holding size
1.	≤ 2	20	40	21.8	20	91.74
2.	2-4	13	26	40.95	31.33	76.51
3.	4-6	7	14	35.00	24.33	69.51
4.	Above –6	10	20	94.3	52.66	55.84
	Total /Av.	50	100	3.84	2.57	66.93



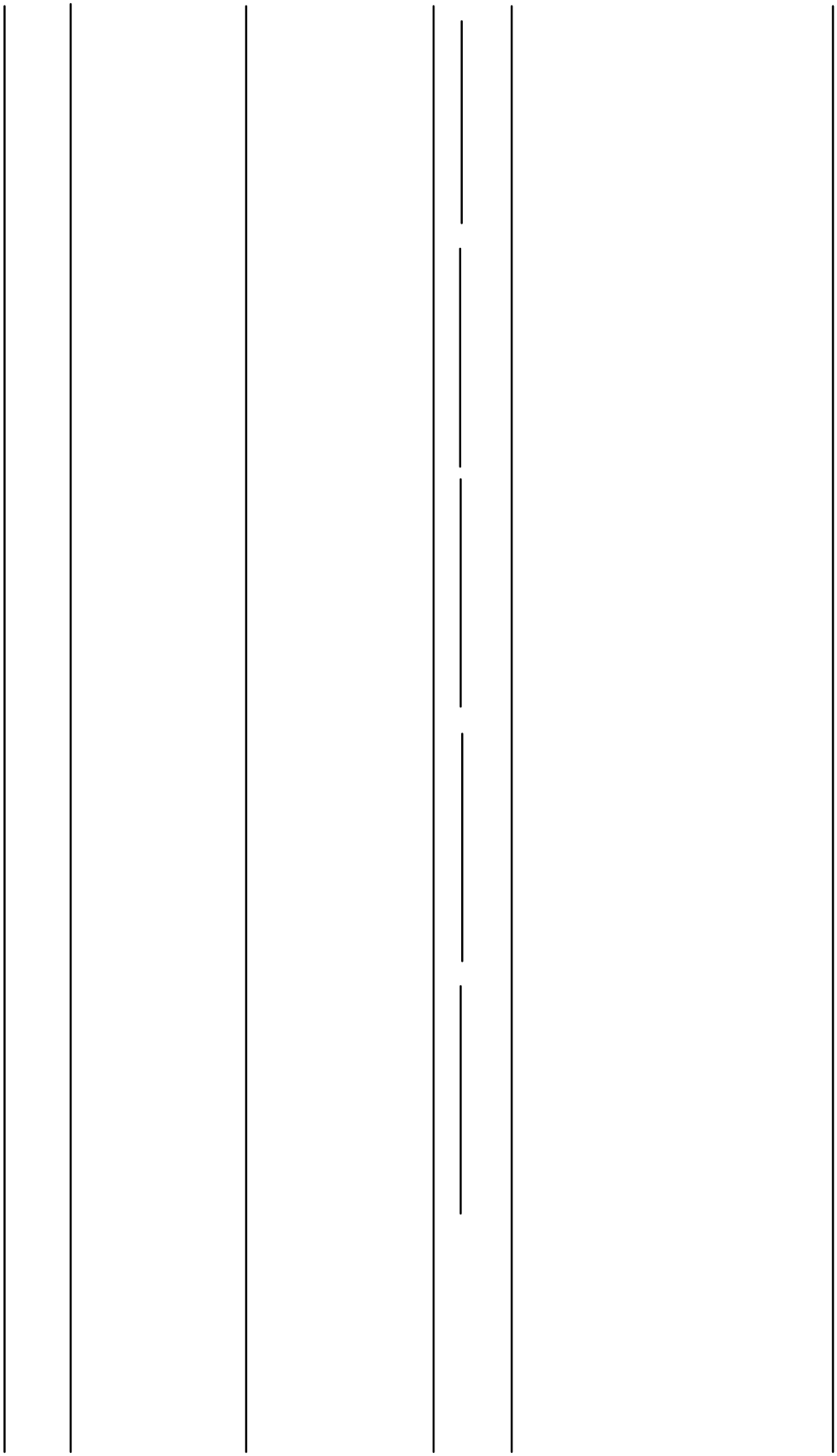


Table 4. Estimation of total return per acre of pineapple cultivation for different farm size group classified according to their size of holdings (Rs. / Acre)

Sl. No.	Farm size class	Land under pineapple cultivation	Value of main product	Value of by product	Total return
1.	≤ 2	20.00	122700.00 (89.00)	15000.00 (10.90)	137700.00 (100.00)
2.	2 – 4	31.33	133067.34 (92.11)	11394.82 (7.87)	144462.17 (100.00)
3.	4 – 6	24.33	137895.60 (92.30)	11508.42 (7.70)	149404.0 (100.00)
4.	Above 6	52.56	144511.96 (91.68)	13121.91 (8.32)	157633.87 (100.00)
Total/Average		128.32	137063.59 (91.53)	12687.03 (8.47)	149750.62 (100.00)

Figures within parentheses indicate percentage of total cost (cost AI)

found to be capital intensive as well as labour intensive.

Pineapple cultivation seemed to be capital intensive and at the same time it was labour intensive. The total cost of cultivation of pineapple was estimated to be Rs. 119104.23 per acre and the return over cost C was worked out to be Rs. 30646.39 per acre with return – cost ratio 1.26 when all sample farmers belonging to different farmer size group were taken together, although, there was a great deal of variation in cost of cultivation, total return, net return, return - cost ratio among different farm size groups. The study also revealed that there was an increasing trend in these parameters with the increase of holding sizes. Again, net return over different cost concept showed a declining trend at subsequent stages as the volume of costs in subsequent stages increased with increase of holding size. The study also showed that the cultivation of the crop required 153 mandays of which 69.23 percent were hired labour and 30.77 percent were family labour when all sample farmers were taken together. The labour absorption capacity would have been increased if marketing and processing activities were taken into consideration. So, from the study, it was evident that pineapple cultivation can play on important role in the economic development of the study region.

REFERENCES

Borad way, A. C. and Broadway, A. A. 2002. *A Text Book on Agri. Business Management*, Kalyani Publishers, Ludhiana. Mukhopadhyay, A.K. 1990. *Crops costs and Variations* (An Investigation Based on Farm Management Studies), Mittal Publications,

Kahlon,A. S. and Singh K. 1980. *Economics of Farm Management*. ICAR, New Delhi.

Panse, V.G. and Bokil ,S.D.1966. *Cost of Cultivation of some Indian Field Crops*. ICAR. New Delhi.