

## Dairy enterprise and whole farm performance in mixed farming systems: Punjab, Pakistan

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### Introduction:

The share of agriculture to GDP in Pakistan is 21%, more than half of which is from livestock. Milk is the major product of livestock. Pakistan is the third largest milk producer in the world with gross annual production of 47M tonnes. 40 million of the country's rural population are dependent on livestock for their livelihood. Punjab province has the largest share of milk production. It is important to understand the economics of dairy production in Pakistan's complex mixed farming systems.

### Material & Methods:

- This study used farm level data from a longitudinal survey in irrigated Okara and partially rain fed Bhakkar districts of Punjab (Table 1, Figure 1). The survey recorded milk production per animal whereas feed quantities, health costs, crops cultivated and herd composition were for each farm from January 2007 to December 2009.
- Whole-farm and enterprise gross margins have been calculated for animal, fodder, crops and vegetable enterprises.
- Labour being permanent, with no significant opportunity costs, has been taken as a fixed cost to estimate operating costs. The value of land managed and livestock owned were assumed to be the major farm assets, with a 9% finance cost per annum for estimating net profit or disposable household income.

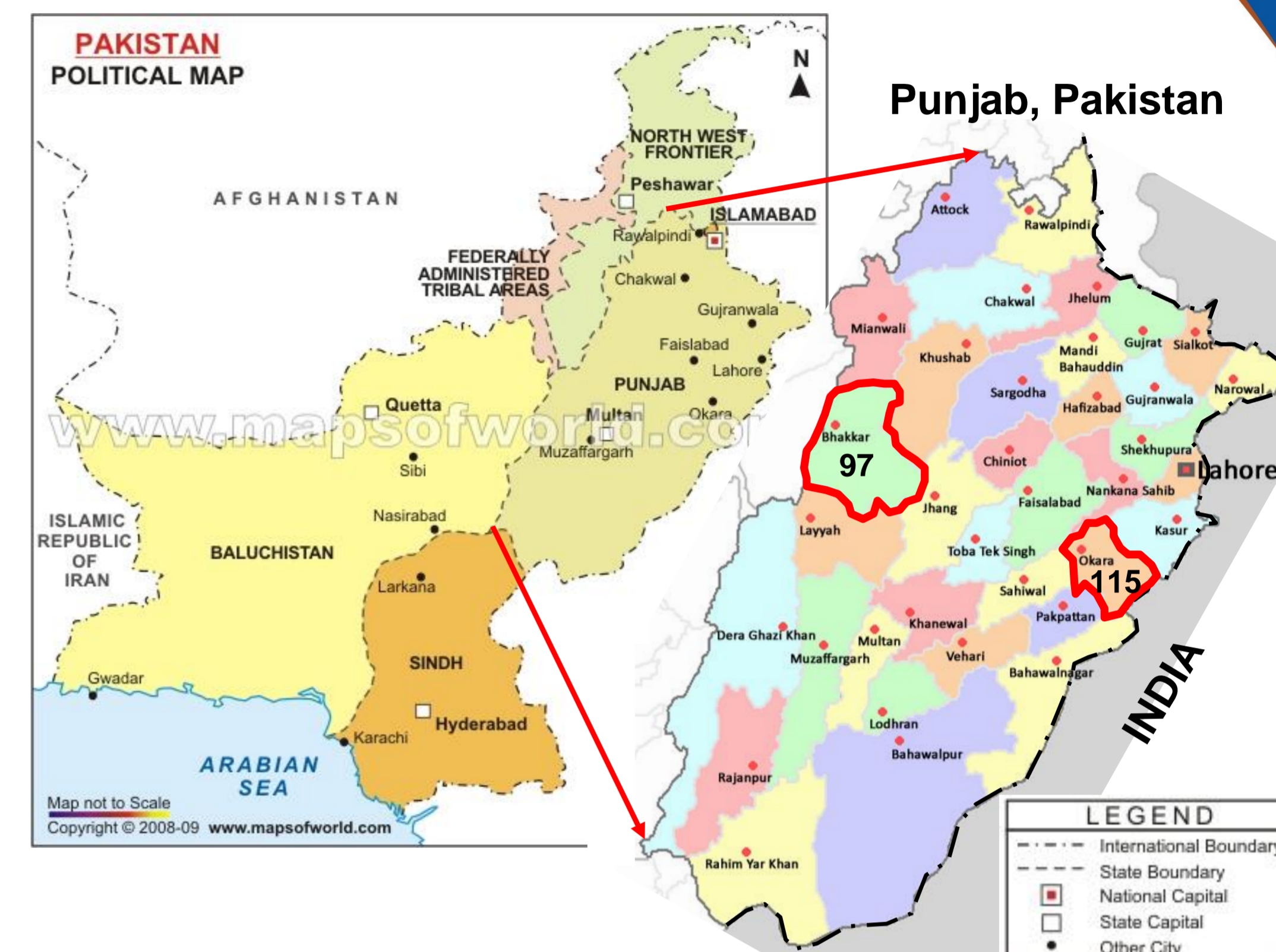


Figure 1: Map of Pakistan and Punjab

Table 1: Mean physical and economic attributes for farms in Okara and Bhakkar districts of Punjab, Pakistan. Standard deviations (SD) in parentheses.

Measure	Okara		Bhakkar	
Total sample size (n)	115		97	
Total land (Acres)	9.04	(7.08)	9.47	(9.00)
Herd size (hd)	10.93	(5.16)	10.50	(5.58)
Milking cows and buffaloes (hd)	3.71	(1.92)	3.77	(2.23)
Total milk production (kg)	3,238	(1,846)	3,288	(2,604)
Milk prices (Rs/kg)	22.99	(2.59)	21.14	(3.01)
Milk average variable cost (Rs/kg)	24.13	(19.19)	19.67	(20.05)
Milk GM (Rs)	13,896	(38,130)	28,026	(41,638)
Livestock activity GM (Rs)	-29,292	(220,241)	-11,625	(151,877)
Total farm gross margin (Rs)	405,771	(425,326)	271,399	(299,857)
Operating profit (Rs)	278,240	(380,650)	132,630	(236,049)
Net profit (Rs)	-218,093	(299,866)	-276,542	(267,778)
Return on assets (Ratio)	4.30	(7.60)	1.87	(6.81)

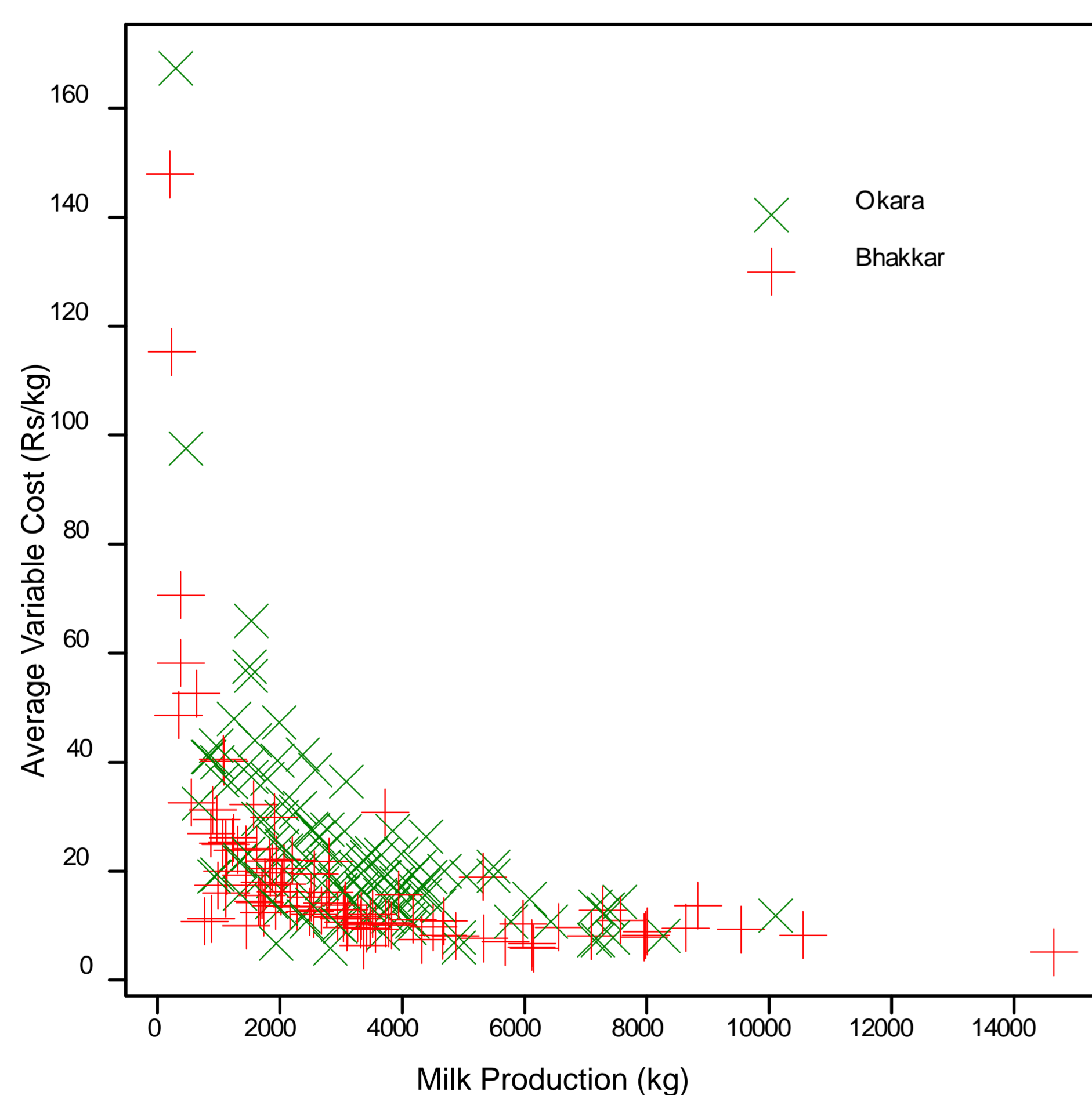


Figure 2: Relationship between Milk Production (kg) and Average Variable Cost (Rs/kg)

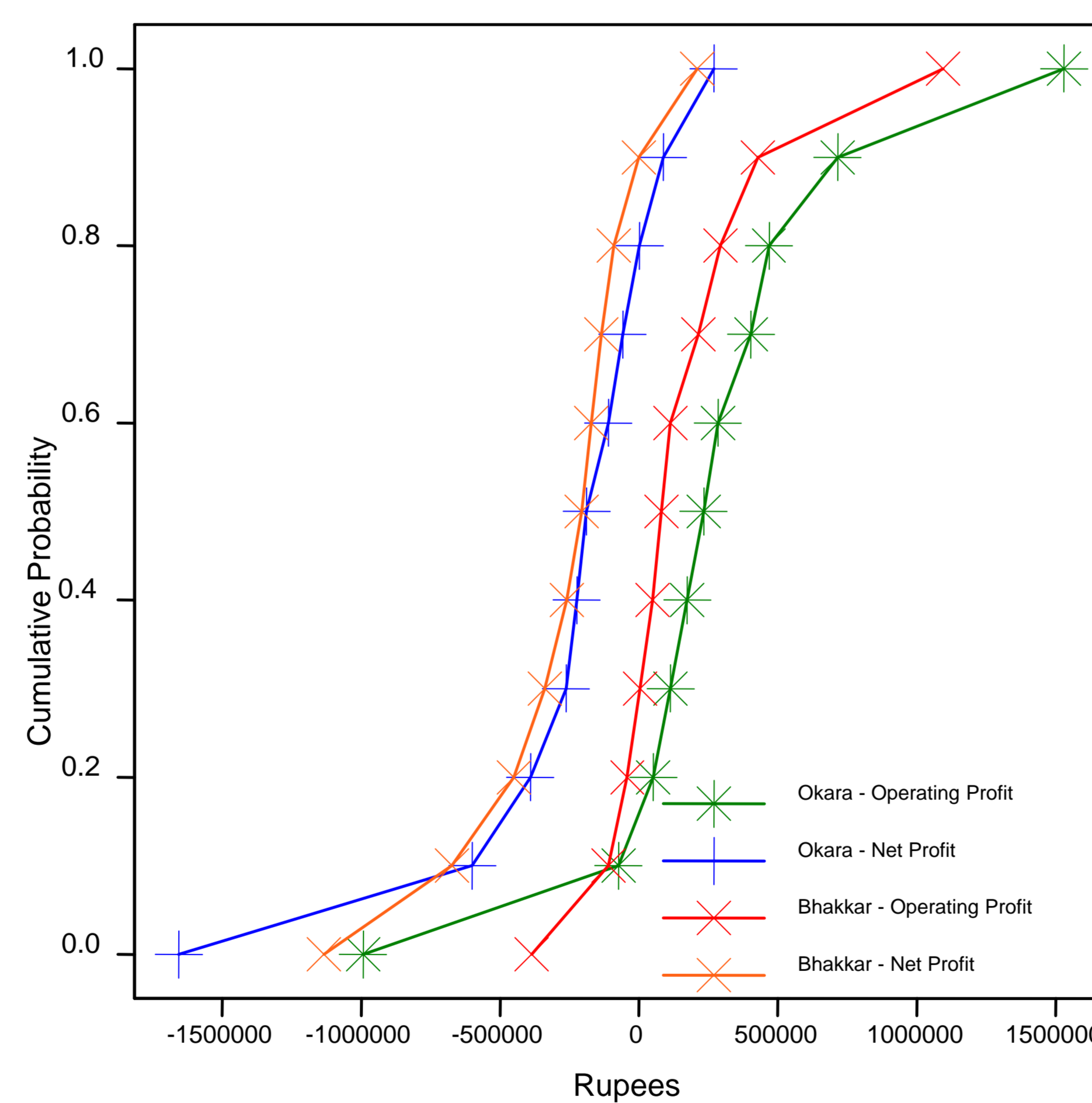


Figure 3: Cumulative Distribution Function (CDF) for Operating and Net Profits

### Results:

- 40% farmers in Okara and 30% in Bhakkar had average variable costs (Rs/kg) higher than farm gate milk prices of Rs 23 and Rs 21 per kg respectively and were thus making losses. Milk average variable costs per kg had an inverse relationship with production (Figure 2, Table1).
- Milk gross margins were slightly positive although overall livestock activity gross margins were negative. The whole-farm gross margin that included crops was positive, mitigating the negative effects of livestock in both the districts.
- Farm operating profits, after removing labour cost from whole farm gross margin estimates, was positive for most sample farms. Net profit showed losses when finance costs were included, though return on assets was higher for Okara than Bhakkar (Figure 3, Table1).

### Conclusion:

- Overall losses from livestock enterprises are possibly due to low productivity and directly related to nutrition and management practices. Our study confirms this premise of the ACIAR project.
  - Actual cost of capital, in particular to the small dairy holder, may be much higher than the assumed (9%), as they borrow from traditional money lenders.
- Question 1.** Does integrated mixed farming limit farmers from capitalising on advantages of becoming specialized producers?
- Question 2.** Are the better production efficiencies we found with larger numbers of milking animals also associated with greater milk marketing efficiencies?

