Milk Supply Chain of Processing Companies and Farmer Efficiency

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Background

- Role of traditional milk collectors, *dodhis*, in dairy milk supply chain.
  - Single buyers of farmer milk.
  - Buyer side monopoly.
- Supply chain of processing companies in Punjab.
- Industry players have gradually increased.
  - Transition from single buyer to multiple buyers.
  - Companies compete to purchase farmer milk.
- Milk districts and non-milk districts in Punjab.

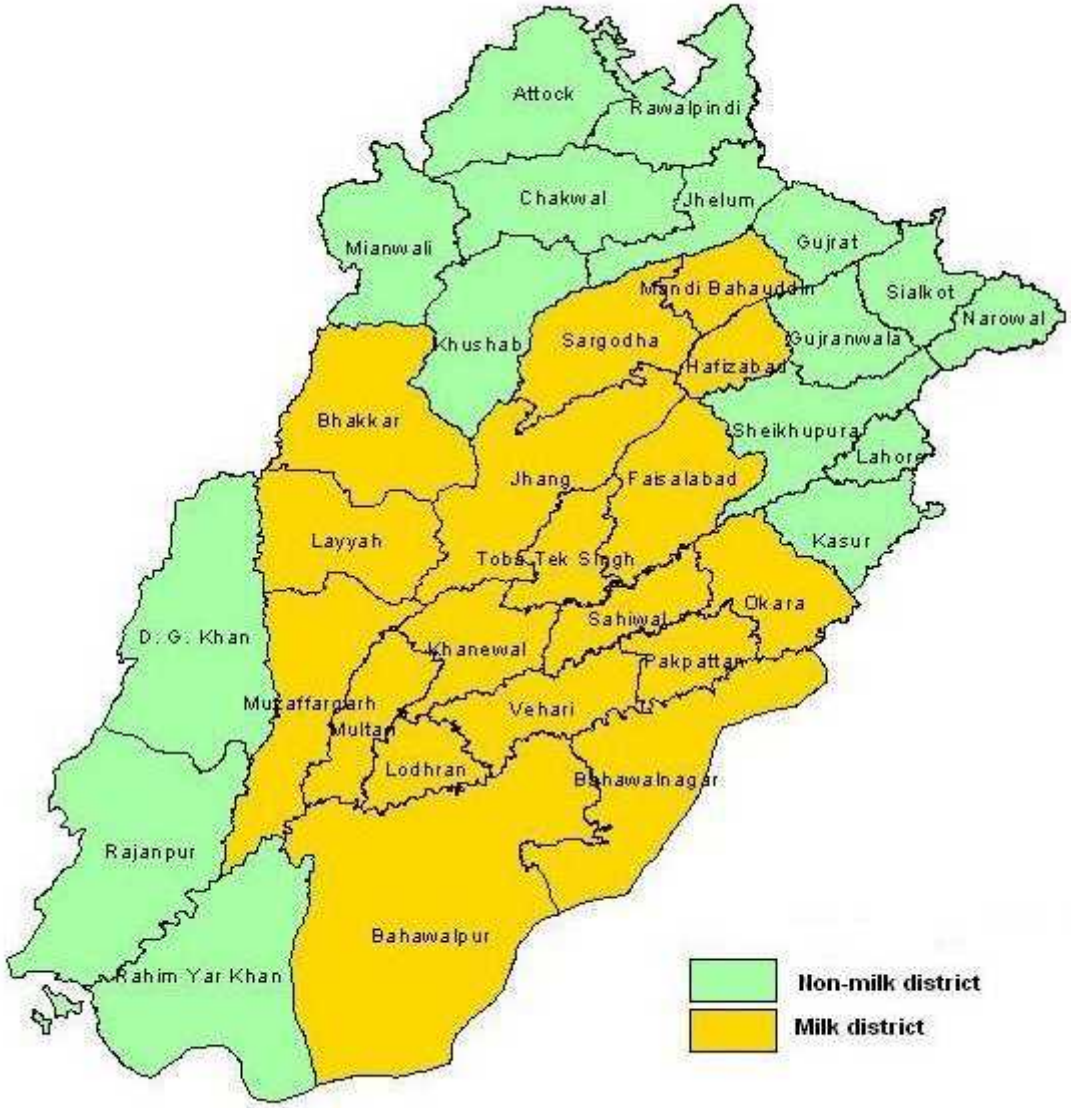
Background

- Rapid growth in agro-food supply chains in global food trade.
    - Supermarkets ↑ share in retail: < 20% in 1990 to 60% in 2003.
- This growth affecting agri supply chains and small producers.
    - quality standards; centralized procurement systems
    - preferred supplier systems
- Little is known on effects on small producers.
  - Do supply chains benefit small producers?
- Impact assessment needed.
  - What is the impact on relative efficiency/productivity.
- I will throw some light on this question.

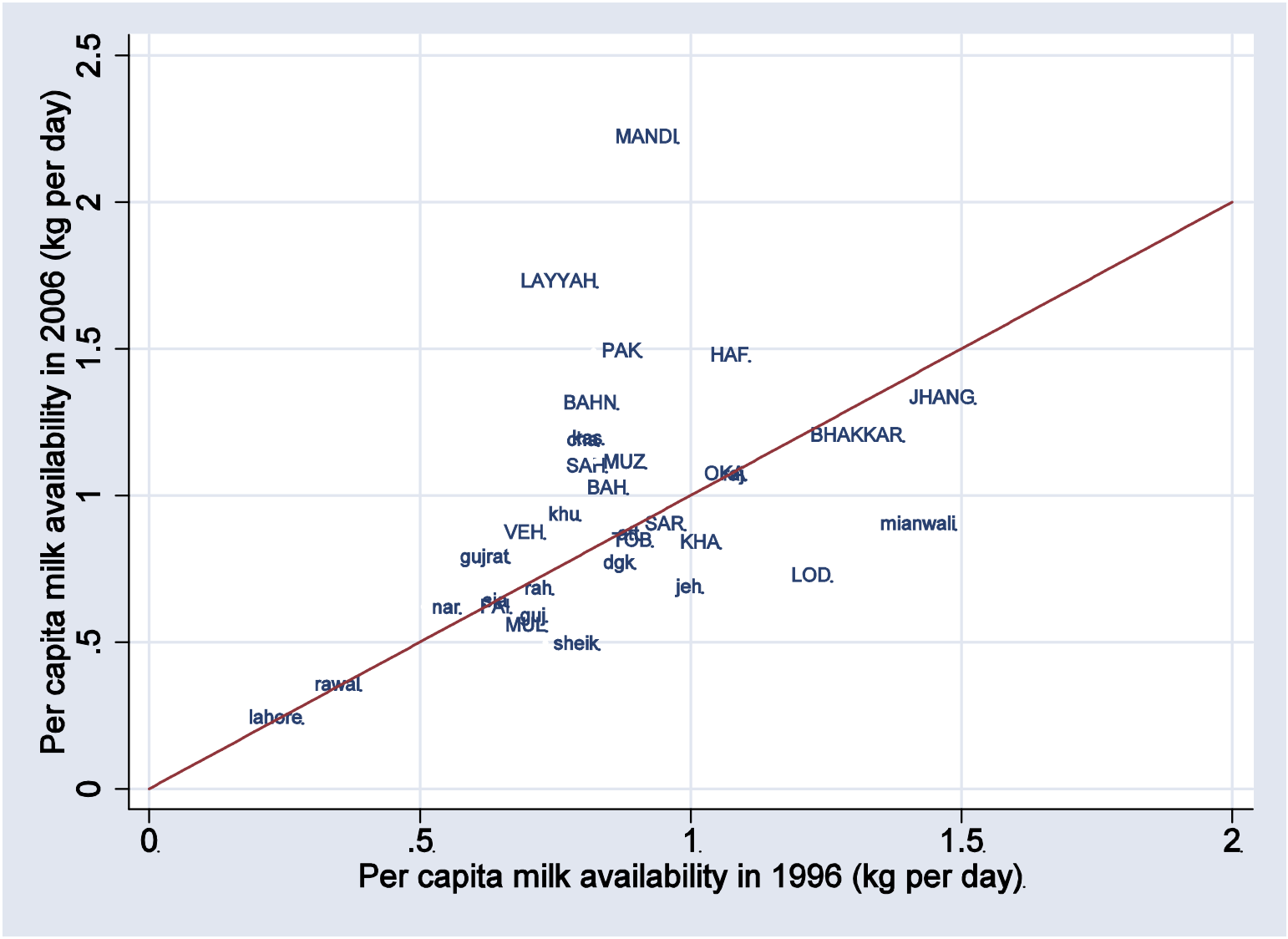
Setting Up a Milk District

- What is involved?
- Selection of location contingent upon:
  1. Milk availability in the area and potential;
  2. Milk production cost and prices in the area;
  3. Share of milk income in total income (income from milk should be visible);
  4. Presence of competitors in the area.
- Basic info on some of these attributes
- Source: Pakistan livestock census.

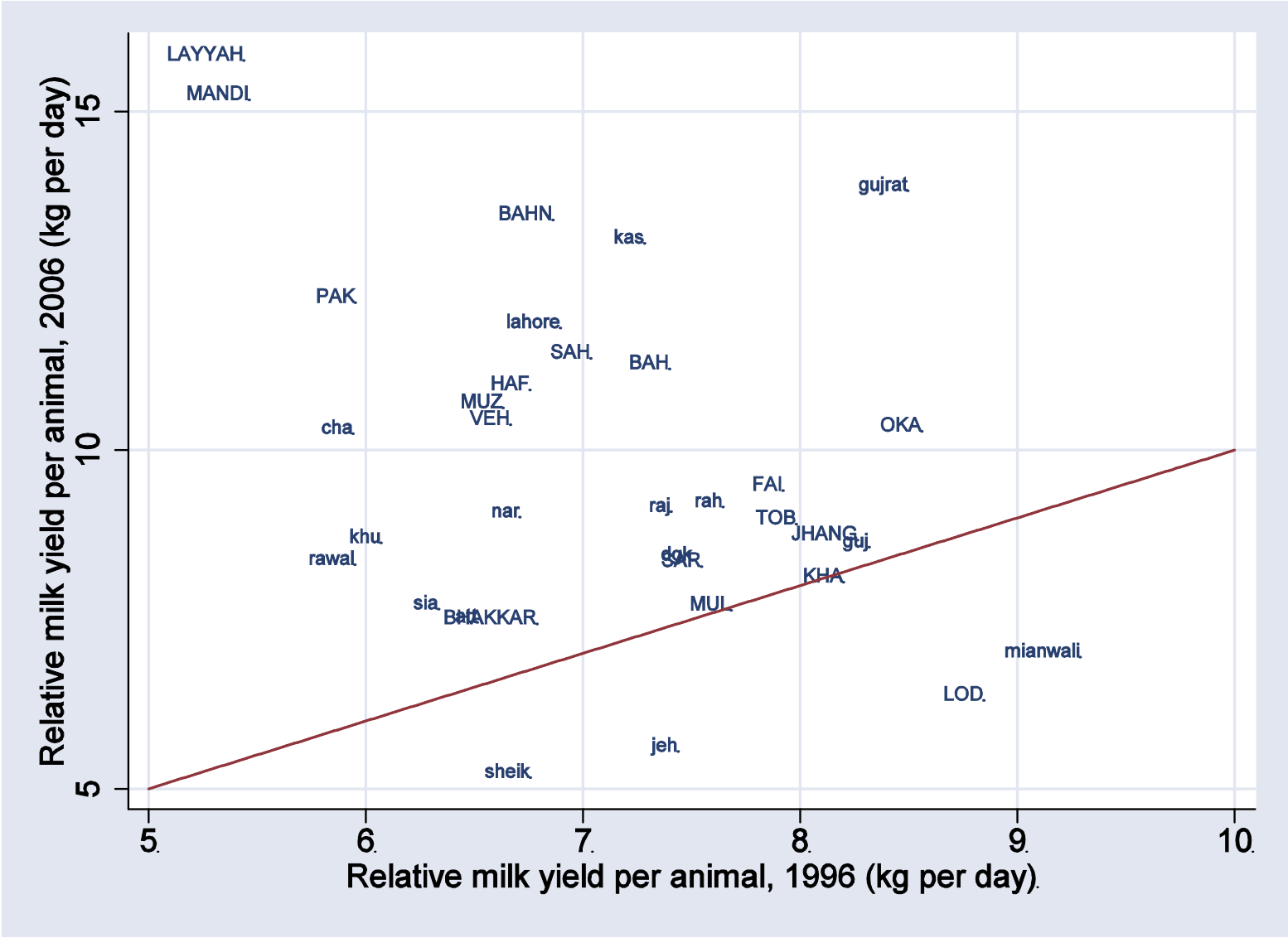
Geographic location of milk and non-milk district in Punjab



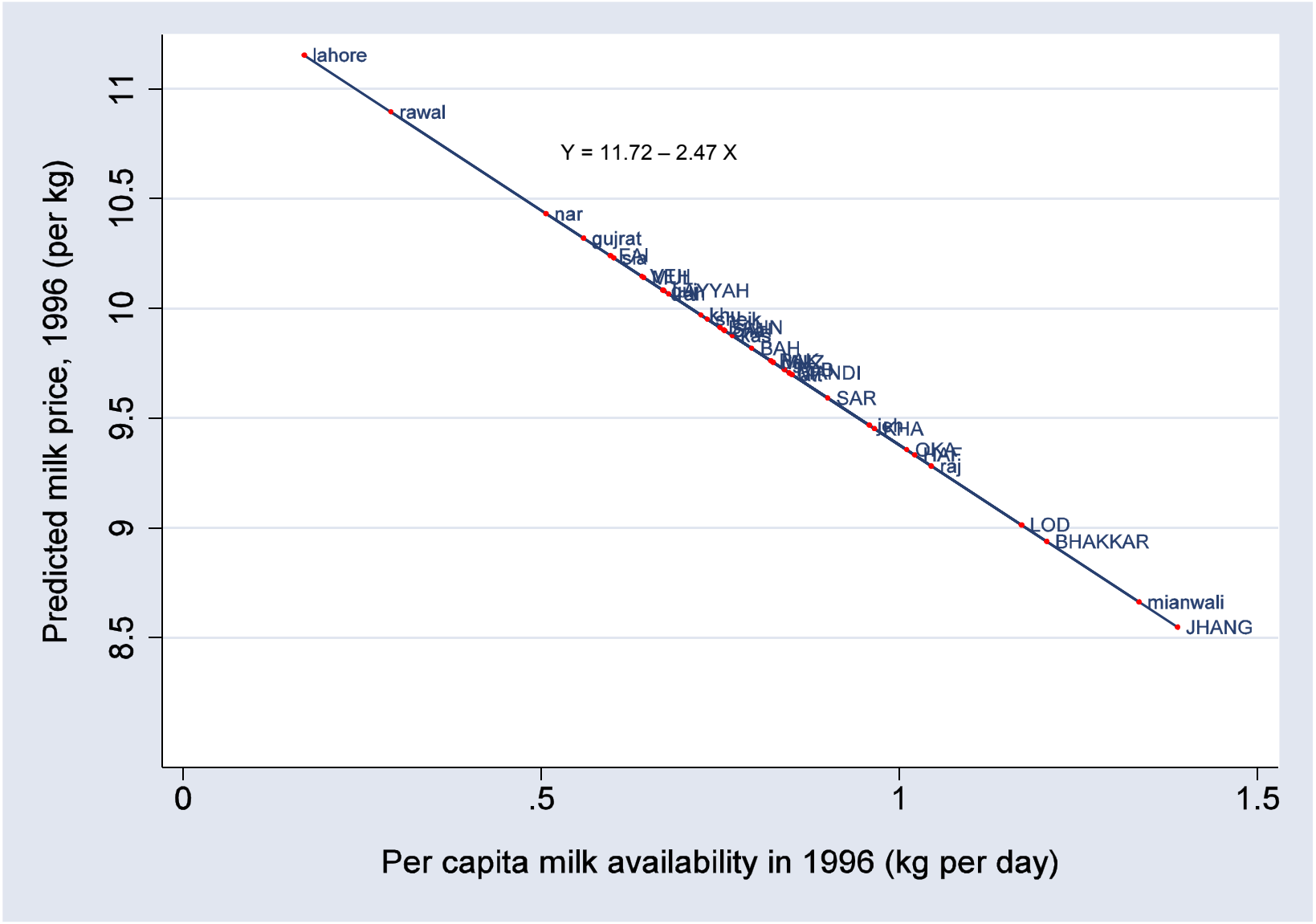
Per Capita milk production in Punjab, 1996 vs. 2006



Relative milk yield in Punjab districts, 1996 vs. 2006



Predicted price of fresh milk by Punjab districts, 1996



Mean Difference: Milk Production, Yield, and Price

Items	Year	Mean		Mean difference	p-value
		Milk district	Non-milk district		
Per capita milk production	1996	0.879	0.716	0.164	0.061*
	2006	1.139	0.755	0.384	0.003***
Relative milk yield (per animal)	1996	6.960	6.956	0.004	0.989
	2006	10.428	9.028	1.400	0.056*
Relative milk price (per kg)	1996	9.169	10.509	1.340	0.0009***

Survey design

- Cross section data has the advantage of comparing households at same point in time, and thus in similar macroeconomic conditions.
- Punjab most populous province: produces nearly 70% of total fresh milk in Pakistan
- Survey conducted from Jan–Apr 2006
- Cluster sampling plan used to draw a sample of 800 dairy HH from rural Punjab

Effects of MD on dairy efficiency

- Findings:
  1. We predict farmer efficiency higher for farms in milk district.
  2. Remoteness of farms decreases efficiency.
     - But MD tend to increase efficiency of farms with their increasing distance from *pucca* road.
  3. Farmers with large herd size are more efficient than small herd sizes.
     - This effect is augmented if large farms are also located in Milk District.

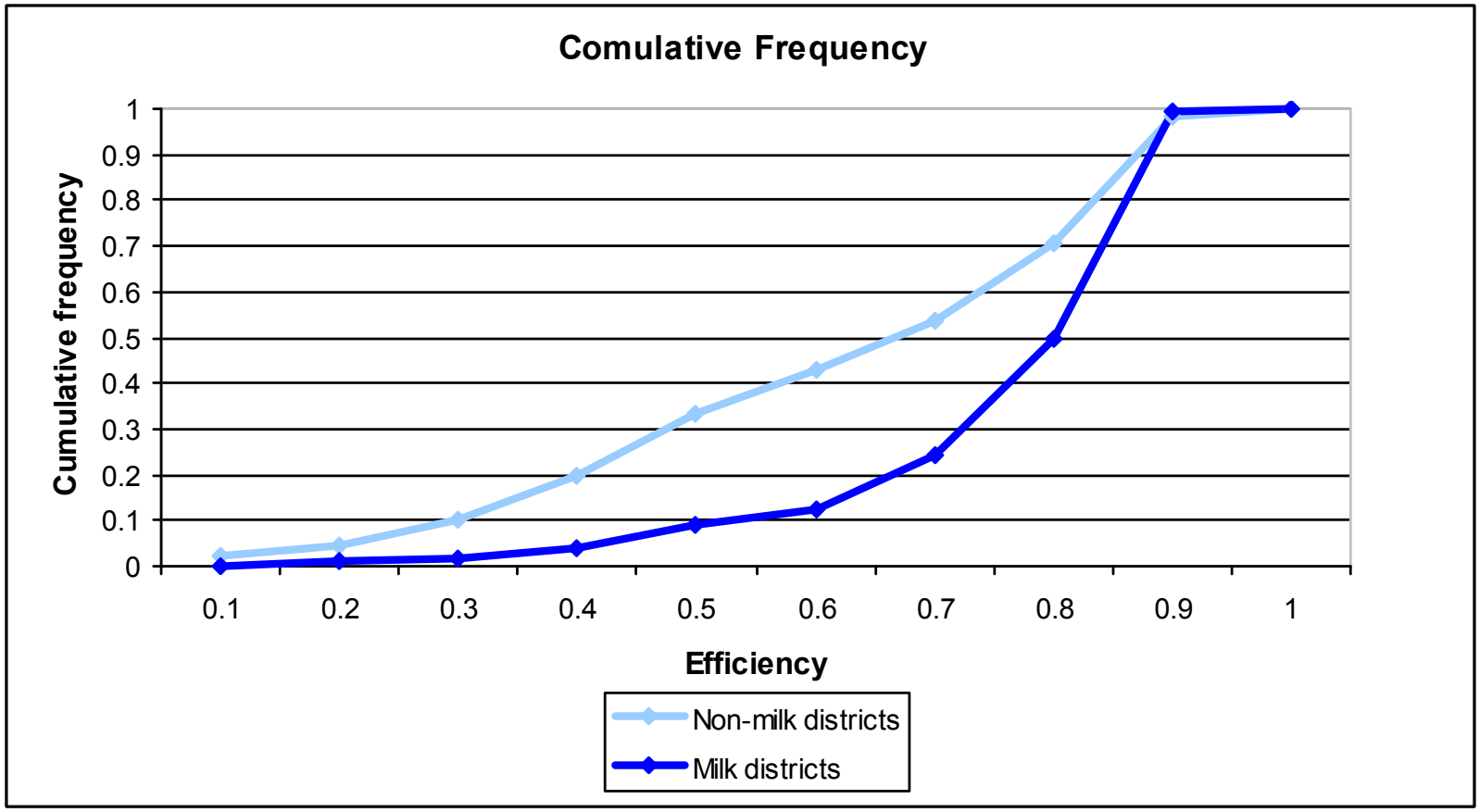
Effects of MD on dairy efficiency

4. Productivity is higher and inefficiency lower when more competition.
    - Increased competition leads to better prices for farmer milk, improved dairy extension services, and more economical ways to manage dairy farms.
    - Increase in number of industry players increases technical efficiency of dairy farms

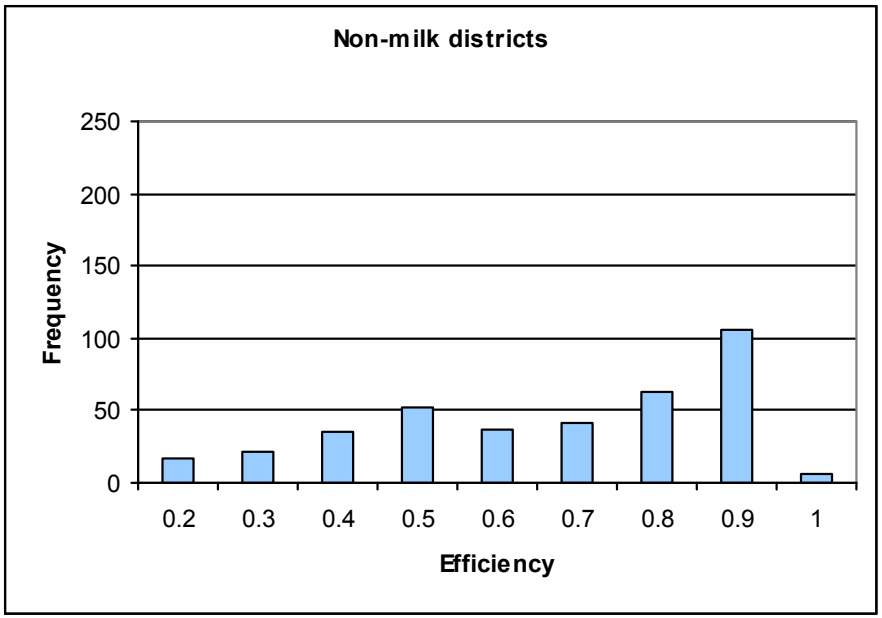
Effects of MD on dairy efficiency

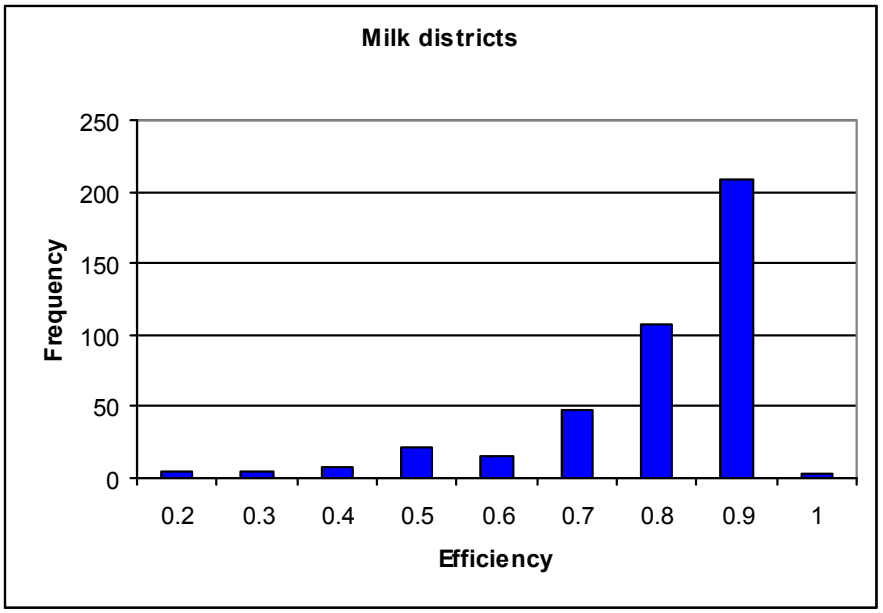
5. Experienced farmers more efficient than inexperienced ones.
6. Timely feeding of water to milch animals plays a significant role in increasing milk production.
   - Farmer who more frequently feed water to their stock are likely to be less inefficient than those who don't.
7. Farmers suffering from severe long term depression are relatively more inefficient than others
8. Our results confirm potential benefits of feeding adequate amounts of concentrate to milch animals.

Cumulative distribution function for estimated technical efficiency

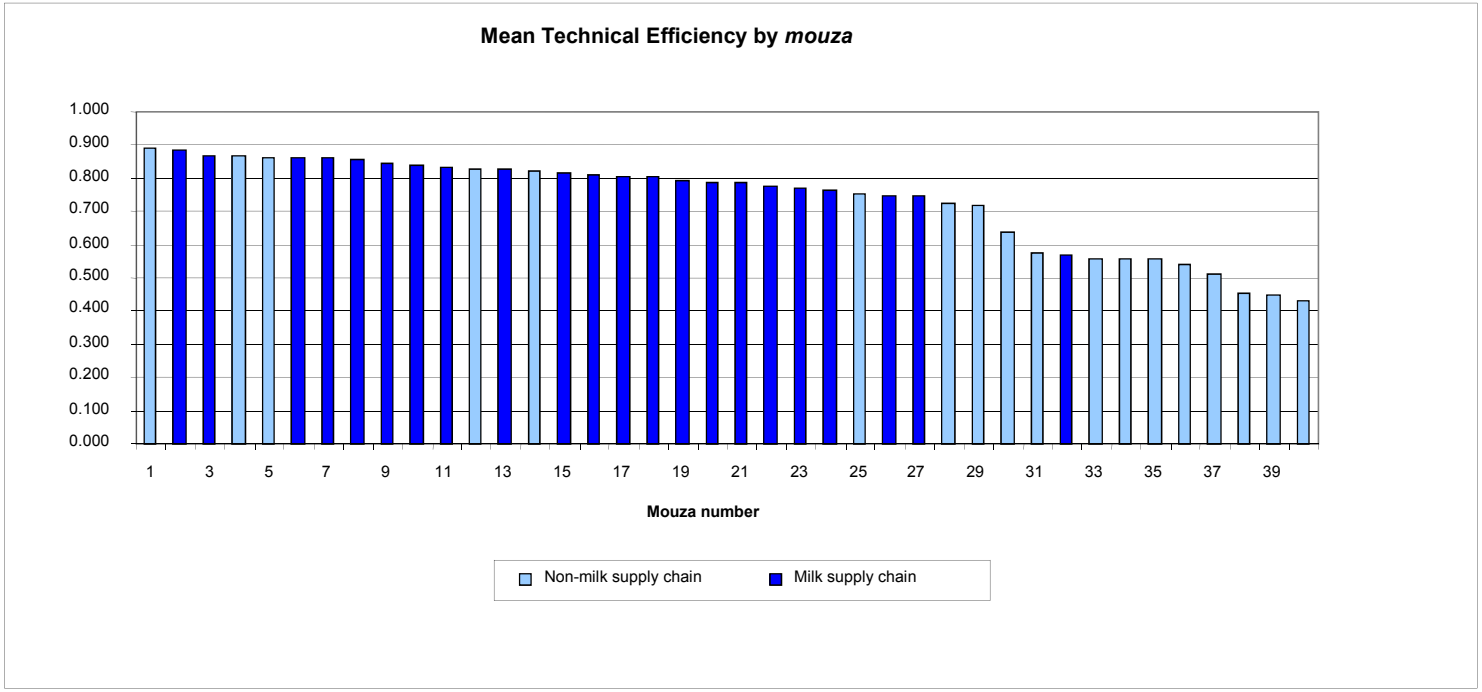


Frequency distribution of mean technical efficiency levels of dairy farms

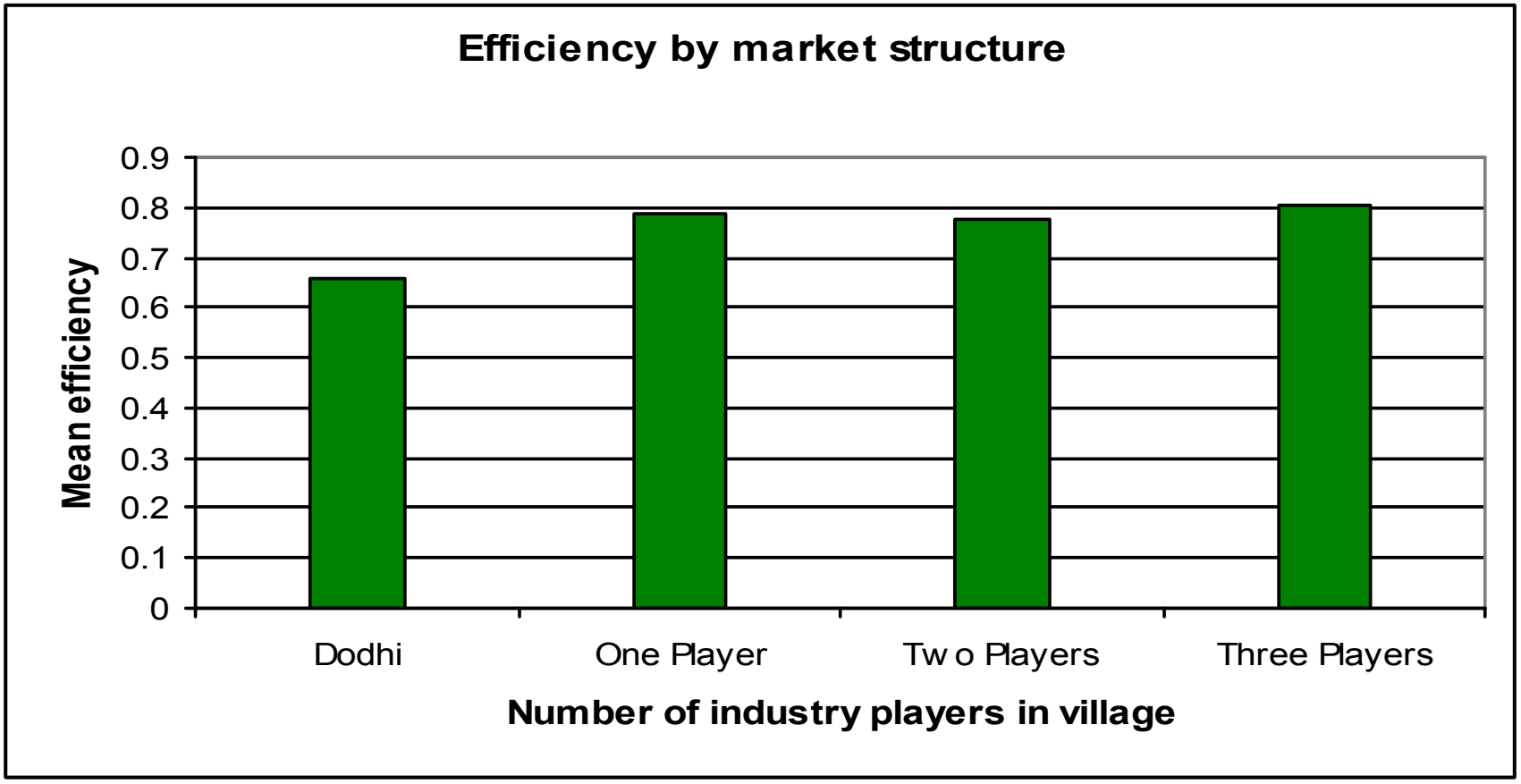




Mean technical efficiency levels by *mouza*



Mean technical efficiency levels by market structure in villages



Efficiency by Herd Size in Milk and Non-Milk Districts