CHAIN COORDINATION MECHANISMS AND CONCERNS IN SUGAR INDUSTRY IN PUNJAB, INDIA

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Introduction

- SCM includes movement and exchange of products and knowledge from farms to final customers; holistic farm-to-fork perspective of food production and marketing that links markets, distributors, manufacturers/processors and producers.
- SCM Efficiencies cause value chain transformation, systems efficiencies in value chain and facilitate integration of different actors and activities leading to greater capacity utilization and operating efficiencies.
- Well-integrated supply chain can generate economies of scale and scope therefore increase the operating efficiency and profitability of all actors.
- Firms enter into alliances because these on their own cannot access appropriate resources to efficiently access product market opportunities.
- In supply chain perspective there can be many more actors and such relationships are often governed by contractual arrangements.
  - Such agreements benefit processing companies through guaranteeing higher quality and timely supplies of raw materials while those between processing companies and distributors/retailers ensure sufficient throughput to processing firms while retailers a guaranteed timely and competitive supplies.
- Contractual relationships (formal/informal agreements) that are costly to break in terms of monetary penalty or lost future business often means that alliance partners conform to their contractual agreements.
- Chain coordination in agriculture
  - product specific and varies across regions
  - Supply chains in developing countries – fragmented; chain coordination-formal/informal/combination of both

Study Objectives and Procedures

Objectives

- To understand macro level industry's environment
- How do sugar mills coordinate supply chains - upstream for a timely and adequate cane supplies and downstream for sugar distribution
- Concerns of sugar mills and farmers in the supply chain

Procedures

- Primary data collection - farmers and sugar mills
  - All the 12 districts clubbed into three groups – low (< 25 thou MT), medium (25 to 50 thou MT) and high (> 50 thou MT) cane production.
  - Two sugar mills (co-operative and private) - high and medium groups; co-operative - low group
  - Thirty six farmers - command areas of each mills; Sample size - 180
  - Data collection
    - Farmers - pre-structured and pre-tested schedules by personal interview for cane marketing *kharif* (winter) season 2005-06; mill gates at the time of cane disposal.
    - Mills - intensive interviews with mill's Manager/Director, Cane Development Officer, Accounts Officer (also handle sugar sales) at mills' premises
      - Data relating to various aspects of chain coordination mechanisms with upstream chain partners (conducting of annual farm surveys, cane collection, cane payments)and downstream chain partners and mill concerns

Results and Discussions

Product Characteristics

- Sugar produced from two plant sources -cane and beet.
  - Sugarcane - tropical and sub-tropical regions of the southern hemisphere; sugar beet - temperate regions of northern hemisphere; Cane processing - white sugar and by-products - bagasse, molasses and press mud.

Industry Scenario - Country Level

- Two sub sectors - organized (sugar mills); unorganized (*gur* & *khandsari)*.
- Sugar plants - various sizes & ownership patterns - cooperative, private and public account for about 54%, 40% and 6% (total 533 mills in operation).
- Post Independence Period - setting up of cooperative mills; Post liberalization - Entry of private sector mills
- Country mainly produces refined white sugar of 100-159 ICUMSA2 (International Commission for Uniform Method of Sugar Analysis), industry uses only sugarcane as an input.
- Traditionally, mills concentrated upon mass production of specified grades. Liberalization and industry front developments – sulphurless sugar, branded and packaged sugar, value added products such as sugar syrups, sugar cubes, etc and bottom lines strengthening
- Sugarcane cultivation

  Tropical region (Maharashtra, AP, TN, Karnataka and Gujarat) - sugar production
  Sub-tropical region (UP, Bihar, Punjab and Haryana) - cane production

Regulatory Framework

- Industry regulation across the entire value chain - cane growers to millers/manufacturers, traders and final consumer.
  - Existence of policy of partial decontrol for sugar sale (since 1967); Proportion initially fixed at 60%, increased to 70% during 1968-69, decreased to 60% but increased to 70% during 1972-73, since then consistently brought down to 10%.
    - Mills deliver levy quota to state governments/nominees at controlled prices.
    - sugar supplied through PDS at the uniform retail issue prices.
    - Price linked to SMP of cane (plus conversion cost recommended by Bureau of Industrial Cost and Prices (BICP)
    - Central government on all India basis fixes SMP for cane for each sugar season; linked to the basic sugar recovery of 9% since 2005-06 (earlier 8.5%) with premium for every increase of 0.1%.
    - State governments brought into practice system of SAPs fixed over SMP.
  - Mills allowed to sell remaining 90% sugar in open markets.
    - Sold through the system of 'regulated release mechanism', uniform and regulated between zones, so scheduled that about 25% annual production remains in mills' stocks.
    - State wise allocations based upon historical data plus state specific festival demand for a month.
    - Mill wise allocations based upon its production/stock position on a pro-rata basis.
    - Monthly release orders issued to sugar mills specifying mill-wise quantity, mills bound to sell sugar quotas evenly during each fortnight, a failure to comply to this is that unsold sugar can be converted into levy sugar.
  - State governments also impose sugarcane purchase tax on sugar mills (varies across states) and cess on sugar produced

Status of Cooperative and Private Sugar Mills in Punjab

Sugar Mills	Cooperative Mills			Private Mills		
	1971-72	1992-93	2006-07	1971-72	1992-93	2006-07
(No)	4	15	15	2	3	8
Crushing Capacity (tpd)	4125	25850	25850	1950	8416	35666
Cane Crushed (lakh tns)	3.66	33.12	16.40	1.95	8.60	34.51
Sugar Prod. (lakh tns)	0.32	3.08	1.57	0.16	0.89	3.29
Sugar Recovery (%)	8.77	9.28	9.58	8.45	10.30	9.54
Working Days (No)	106.25	141.06	100.77	128.50	115.33	141.00
Shares (%)						
Cane Crushing Capacity	67.90	76.89	40.86	32.10	23.11	56.37
Cane Crushed	65.30	79.38	32.21	34.70	20.61	67.79
Sugar Production	66.13	77.62	32.30	33.87	22.38	67.70

Chain Coordination - Mill Level

- **Cane Purchase**
  - Mills in its command area enters into formal contracts with farmers.
  - Conduct a comprehensive annual farm survey (May/June) to assess each cane grower's area under early, mid and late cane varieties and major cultivable practices - plant & ratoon.
  - Mills estimate cane production based upon previous average cane yields, work out per visit cane delivery coupons for the season, distribute coupons along with entry numbers to farmers at their doorsteps three to four days in advance.
- **Sugar Distribution**
  - Deptt Food & Public Distribution allocates sugar sales quotas to private mills while State Sugarfed to cooperative mills.
  - Coop Mills can sell sugar only to govt approved licensed agents and actual users, Supply agents attached to each mill from both within and adjoining states.
  - Agents collect sugar purchase orders from wholesalers, place along with delivery instructions before mills, arrange for sugar deliveries and collect payments from wholesalers for client mills, mills pay commission @ 0.5% - 0.75%
  - Sugarfed releases sugar to agents at prices fixed on monthly basis (daily during a festive season) determined by open market forces , previous years' stocks fetch a lower market price.
  - Financial and physical handling of sugar at a mill level.
  - Sales agents required to sell sugar within two weeks of its receipt, secondary sale deeds transacted through brokers (charge up to 0.25%).
  - Sugar moves from mills as mass product to wholesale/retail markets; Retailers break down whole lots and pack sugar into consumer packs

Cane Disposal (tonnes) Patterns of Sample Respondents

Month	Farmers		Average Mill Visits		Cane Quantity	
	No	(%)	No	Quantity	Total	(%)
November.	80	44.44	6.21	815.56	6524.50	17.46
December	133	73.88	8.40	1214.05	16147.50	43.22
January	133	73.88	5.06	733.83	9760.00	26.12
February	94	52.22	3.78	518.99	4878.50	13.05
March	1	0.55	3.00	450.00	45.00	0.12
Overall	180	100.00	5.99	845.78	37355.50	100.00

Chain Concerns – Sugar Mills

Sugarcane Area, Production and Yield in Punjab

Year	Area (Lakh ha)		Production (Lakh Metric tones)		Yield (qtls/ha)	
	Abs	Change (%)	Abs	Change (%)	Abs	Change (%)
1970-71	1.28	---	52.70	---	417.10	---
1980-81	0.71	-44.53	39.20	-25.62	552.60	32.49
1990-91	1.01	42.25	60.10	53.32	594.10	7.51
2000-01	1.21	19.80	77.70	29.28	642.50	8.15
2006-07	0.99	-18.18	60.20	-22.52	608.30	-5.32

Chain Concerns - Cane Growers

- Farmers fully dependent upon industry for cane disposal and timely cane payments.
- Minimal dependence upon mills for securing essential farm inputs, facilitates shifting of cropping patterns during the downward phase of industry
- Of the two alterative crops, paddy - less labour intensive and existence of public procurement system eases crop disposal during a short duration; cotton - can easily be shipped either to a market in the adjoining state or sold to CCI ;Existence of CAs in wholesale markets and long term business relationships ensures timely payments.
- On input side - timely non-availability of labour, farm inputs and electricity.
- Cane shipments - prohibited entries through cities farmers use bypasses costs.
- Opportunistic price renegotiations - cane weighing in poorly lighted rooms at night, use of manipulated scales, undervaluation of cane juice, etc.
- Inadequate basic infrastructure - mettled cane shed areas; proper security arrangements, bathrooms, see through guest houses.
- Mills issue coupons to uncontracted farmers - delays issuing coupons to contracted farmers.
- Waiting time at a mill gates - goes up because of slower speed of crusher or delays in repairing plants, problems emerge particularly at cooperative mills.
- Fellow farmers
  - Bribe mill employees (cash or kind) who oblige by over-weighing cane
  - Farmers in queues disappear for food/tea, etc., gives rise to quarrels
  - Large farmers develop personal networks to get cane supply coupons issued early and more frequently.

Conclusions

- Mutual interdependences of chain partners facilitates chain coordination with upstream /downstream chain partners
- Ensures timely cane supplies to sugar mills while easy cane disposal and timely payments to cane growers despite small holding sizes.
- Industry has expanded capacity but cane production has not kept pace with it because of the existence of public procurement system for the alternative *kharif* crops. Industry has secured increased cane supplies because of a continuous hike in the SAPs of cane.
- Cooperative segment of industry has come to face a fierce competition from its private segment and is running into losses since the liberalization of economy because client farmers divert cane supplies to private mills pay slightly higher prices and make prompt cane payments. In comparison, private sugar mills because of comparatively greater market orientation in its operations have steamed ahead of co-operative mills.
- In the agricultural sector particularly in the developing countries (farming is a vital source of livelihood) processing firms are not always able to achieve supply chain efficiencies in its operations in the midst of
  - a variety of market dualisms that exist and vary widely across region and crops
  - Sector's heavy dependence upon nature
  - Diversity in firms' scales of operations and ownership patterns.
  - This is wherein agricultural sector is predominant and
- This weakens individual firm's position (economically as well as politically) for an effective implementation of even formal contracts particularly with its upstream chain partners to obtain requisite supplies of the basic raw materials.


Thanks