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Vasant Gandhi
*Centre for
Management in
Agriculture, Indian
Institute of
Management*

Gauri Kumar
*Gujarat Agro-
Industries
Corporation*

Robin Marsh
*Center for
Sustainable Resource
Development,
University of
California*

Agroindustry for Rural and Small Farmer Development: Issues and Lessons from India

ABSTRACT: This article examines the priority given to agroindustries in India in the context of their role in rural and small farmer development. The features and constraints of agroindustry are examined to assess their real and potential contribution and challenges faced. Institutional and organizational models that have been tried or proposed in India are evaluated from the point of view of performance and contribution to rural and small farmer development. The article then draws policy and managerial implications.

INTRODUCTION

Agroindustry has historically been given high priority in Indian policy and development programs. The focus on agroindustry as an agent of rural develop-

ment and employment creation was present in Mahatma Gandhi's emphasis on village-based agroindustry during India's independence movement, and is today a central part of the national development plan (see India Planning Commission, 1996). There is optimism concerning its continuing development: the FAIDA report of the Confederation of Indian Industry (CII) and McKinsey and Company (1997) both show that there is great potential for development of food processing and other agroindustry.

However, India's agroindustry development is today plagued by tough challenges, including costly raw material, supply chain inefficiencies, and market demand constraints (see Srivastava and Patel, 1994; Goyal, 1994; CII-McKinsey, 1997). There are concerns about whether multinational firms contracting small farmers will help or hurt small farmers and local small agroindustrial firms; this debate is indeed generalized in developing countries (Glover and Kusterer, 1990). There are concerns about whether the cooperative movement can effectively promote agroindustrial development for small firms.

The private sector as well as government are at a cross-roads in the choice of the best models for agroindustrial development—what kind of institutional and organizational arrangements/models are appropriate for overcoming current constraints, and maximizing their contribution to rural and small farmer development? This article focuses on that question, and proceeds as follows. First, we sketch the history of policy and program approaches to agroindustry development in India. Second, we describe the current structure and characteristics of agroindustry in India, and summarize the literature's analysis of its constraints. Finally, we discuss the major models for organizing Indian agroindustry that have been experimented with or proposed recently in India. We draw lessons from the experiences of those models.

BACKGROUND: A BRIEF HISTORY OF APPROACHES TO AGROINDUSTRY DEVELOPMENT IN INDIA

The movement for political independence up to the late 1940s under the leadership of Mahatma Gandhi included an encouragement of village agro-based industries. The objective was to involve rural people in development and the independence movement, and to reduce external dependence (Goyal, 1994). The ideology was economic, social, and political. Though the model involved the rural poor in development action, it later failed because it became a blanket basis for nationalists to favor less efficient techniques of production and oppose modern industry, and did not meet consumer wants and needs.

Between 1950 and 1980 agroindustry policy was dominated by Prime Minister Nehru and his economic think-tank led by Mahalanobis. They argued that India

Table 1. Importance of the Agroindustry Sector in India

<i>Industries</i>	<i>Percentage Share</i>		
	<i>No. of Factories (1996/1997)</i>	<i>Employment (1992/1993)</i>	<i>Net Value Added (1996/1997)</i>
Agro-based food industries	16.69	13.67	5.85
Agro-based non-food industries	29.09	29.23	15.74
Total agro-based industries	45.78	42.89	21.59
Other (non-agro) industries	54.22	57.11	78.41
All Industries	100.00	100.00	100.00

Source: India, Annual Survey of Industries.

needed large capital goods industries for modernization and growth. The strategy relied on the large industries for the capital goods sector, while the consumer goods sector was primarily for small-scale rural agroindustry, labor-intensive and capital-saving. This was consistent with the need to reduce demands on limited capital and savings, and to expand employment. However, such small-scale agroindustry, because of old technology, inadequate management, and weak capacity to invest, often failed to meet the expanding and changing market demand for quality goods coming from the rapid growth in population and rising incomes.

Starting in the 1980s, there has been a new effort for promotion of agroindustry in India with emphasis on market demand, up-to-date technology, and efficient management of the supply chain. There has been a substantial relaxation of government restrictions of technology import and private foreign direct investment (Goyal, 1994). However, this current trend towards large private agroindustrial units risks bypassing small farmers and the rural poor.

CHARACTERISTICS OF THE AGROINDUSTRIAL SECTOR IN INDIA

Data from the annual survey of industries¹ show that 46% of all factories in India are agroindustrial (Table 1), and they contribute 22% of the manufacturing value added and nearly 43% of manufacturing industry employment (India Ministry of Planning, 1996). Table 1 indicates that 37% of the agroindustrial firms produce food and 63% produce nonfood products. Table 2 shows that 44% of the food related factories are in milling (mainly grain), another 13% are in edible oil, 10% are in sugar, and 33% in "other foods" such as higher value foods with higher income elasticities of demand. The "other foods" category accounts for 49% of total net value added and 43% of employment in agroindustry, while only 7% of value-added and 20% of employment comes from grain milling.

Table 2. Importance of Selected Food Industries in the Agro-Food Industry Sector

<i>Industries</i>	<i>Percentage Share</i>		<i>Net Value Added (1996/1997)</i>
	<i>No. of Factories (1996/1997)</i>	<i>Employment (1992/1993)</i>	
Grain milling	44.38	20.30	7.05
Edible oils	13.11	7.74	21.48
Sugar	9.58	28.57	23.03
Other foods	32.93	43.40	48.45
Total foods	100.00	100.00	100.00

Source: India, Annual Survey of Industries.

Table 3 shows that only 18% of total industrial fixed capital is in agroindustry; compared to agroindustry's 43% share in industrial employment. Thus, agroindustry continues to be relatively labor-intensive and capital-saving. The labor share of value added is 48% in agroindustry versus 35% in other industries. Agroindustry, on average, generates employment for 14 persons per investment of Rs.100,000—versus three per Rs.100,000 for other industries. Moreover, these figures do not include added employment generated in agriculture and input supply through backward linkages. Finally, agroindustry requires less fixed capital and more working capital compared to other industries. On average, agroindustry annually generates 51% value-added over fixed capital, as compared to only 39% in other industries.

India launched significant economic liberalization reforms in 1991. What effect have reforms had on agroindustry? Available data give a preliminary idea of agroindustry's response. Table 4 shows prereform and a postreform GDP growth by subsector before and after liberalization in constant prices. The growth rate in food agroindustry was over 10% in both periods, and in nonfood agroindustry growth rates doubled from 3.7% to 7.7%. For the agroindustrial sector as a whole there was an increase in the growth rate from 5.2% to 8.3%, indicating a positive impact of the reforms. Interestingly, other industries actually show a deceleration from 12% to 7.2%.

Employment growth differs over agroindustrial subsectors. Table 5 provides data for 1984 to 1990 and 1990 to 1996, showing employment is growing fastest in dairy, fish canning and preservation, edible oils, chocolate, and cashew processing. In aggregate terms, with some exceptions, a positive trend is evident for food agroindustry employment in the recent period just before and during early implementation of the economic reforms. Again, this does not include employment generated in the agriculture/fishery/cattle-raising sectors through backward demand linkages, which typically adds significantly to total employment creation in the food chain.

Table 3. Some Structural and Financial Features of Agroindustry in India

Description of Industry	Share of Fixed Capital (Percent) (1996/1997)	Total Persons Employed per Factory (1992/1993)	Fixed Capital per Factory (Rs./Million) (1996/1997)	Emoluments as a % of Net Value Added (1992/1993)	Percentage of Physical Working Capital to Invested Capital (1996/1997)	Net Value Added to Fixed Capital (1996/1997)	Labour to Fixed Capital Ratio (per Rs. 100 thousands) (1992/1993)	Materials Consumed to Value of Output (1996/1997)
Agro-based food industries	4.40	55.60	8.07	45.16	57.24	54.9	14.82	74.68
Agro-based non-food industries	13.15	70.82	13.82	49.13	32.30	49.5	14.18	55.57
Total agro-based industries	17.55	65.14	11.73	47.95	41.01	51.3	14.38	64.00
Other (nonagro) industries	82.45	79.96	46.50	35.31	23.39	39.4	2.98	51.34
All industries	100.00	72.85	30.58	38.21	27.22	41.3	4.51	55.03

Source: India, Annual Survey of Industries.

Table 4. Performance of Agroindustry: Comparing Pre-Reform with Post-Reform Periods

<i>Industries</i>	<i>Growth Rate of Value Added (GDP) by Industry</i>	
	<i>1984/1985 to 1989/1990</i>	<i>1990/1991 to 1995/1996</i>
Agro-based food industries	10.45	10.27
Agro-based nonfood industries	3.70	7.70
Total agro-based industries	5.15	8.30
Other (non-agro) industries	12.00	7.20
All manufacturing industries	9.23	7.60
Agriculture	5.67	2.68

Source: India, Central Statistical Organization, National Accounts Statistics.

CONSTRAINTS FACING AGROINDUSTRY

The first constraint is inadequate supply of raw materials from agriculture. Figure 1 shows a plot of the index of agro-food industrial production (India, Ministry of Finance, 1998), as well as the index of agricultural production (India, Ministry of Agriculture, 1998) from 1960 to 1997 (both in real terms). The graph shows that agro-food industrial production has steadily outpaced agricultural production, that there are significant fluctuations over time in the growth of agro-food industrial production, and there is a significant rise in production in the postreform period of the 1990s. The Indian literature has emphasized that agroindustrial growth in India has historically been constrained by both supply of raw material and slow growth in consumer demand for agroindustrial products (see Srivastava and Patel,

Table 5. Profile of Increase in Employment in Agro-Food Industries

<i>S.No.</i>	<i>Industry</i>	<i>Percentage Change</i>	
		<i>1979/1980 to 1988/1989</i>	<i>1988/1989 to 1993/1994</i>
1	Meat	-21.62	8.47
2	Dairy	47.33	39.41
3	Fru & veg can/pres.	2.85	22.08
4	Fish can/pres.	-0.26	89.12
5	Milling	33.10	15.93
6	Bakery	35.53	1.00
7	Sugar fine	-35.85	5.80
8	Sugar indig.	-23.41	-9.92
10	Chocolate	81.62	65.43
11	Hyd. oils/vanas.	4.36	17.28
12	Edible oils	-24.22	72.59
13	Tea	-21.54	5.07
14	Coffee	36.91	-40.68
15	Cashew	-42.60	106.44
17	Animal feed	52.23	35.94
18	Starch	-7.08	18.00
19	Other food prod.	-0.91	-14.13

Source: India, Annual Survey of Industries.

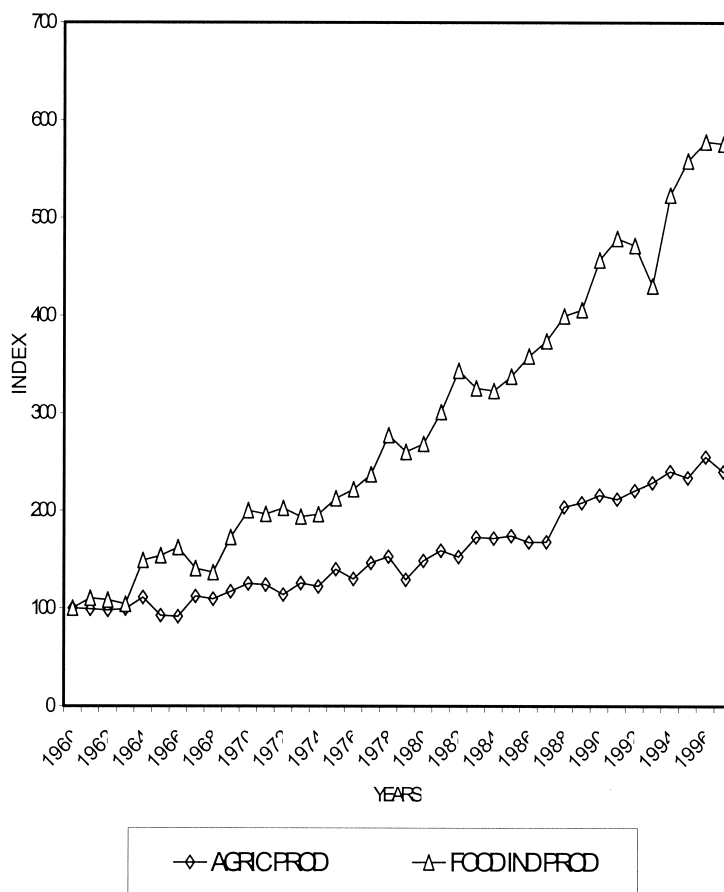


Figure 1. Agro Food Industry Production and Agricultural Production in India.

1994; Boer and Pandey, 1997). To explore the extent to which agricultural production determines agroindustrial output, we estimated with OLS the following regression model.

1. $FOODINDEX = a + b_1 * AGRPROX + b_2 * GDPFC + e$
2. $FOODINDEX = c + d_1 * AGRPROX + d_2 * NNPCAP + u$

Where

Foodindx = index of production of food products industry
Agrprox = index of agricultural production
Gdpfc = GDP at factor costs in constant prices
Nnpcap = net national product per capita in constant prices

Table 6. Regression Estimates: Dependent Variable FOODINDX

	<i>Independent Variables</i>				<i>R</i> ²	<i>F-stat</i>
	<i>Constant</i>	<i>AGRPROX</i>	<i>GDPFC</i>	<i>NNPCAP</i>		
Coeff.	−60.36	1.1708	0.001201		0.9713	592.37
t-Statistic	−2.32	2.883	4.265			
Significance	**	***				
Coeff.	−211.86	1.8279		0.1231	0.9611	458.08
t-Statistic	−7.766	4.366		2.545		
Significance	**	***		***		

Note: Significance: ***at 0.99, **at 0.95, *at 0.90 levels.

a, b, c, d = Parameters

e, u = Error terms

The results in Table 6 indicate that agricultural production is a strong and significant determinant of agro-food industrial output supporting the important role of raw material supply—and showing that Indian agroindustry does not rely on imports of raw materials. The results also show that GDP at factor costs, as well as NNP per capita, both have a strong and significant relationship with agro-food industrial growth supporting consumer demand as a strong determinant of growth in the agro-food industry, as Bennett's Law predicts.

A second constraint is the poor quality of much raw material (Srivastava and Patel, 1994; Kejriwal, 1989; Gulati et al., 1994). Available raw material is often of unsuitable quality, processing varieties are frequently not available, and the period of availability of the raw material is too short and unreliable. Gulati et al. (1994) show that only about 0.5% of the fruits and vegetables grown in India are commercially processed, partly for quality reasons.

A third constraint is the obsolete technology often used in processing, resulting in low efficiency and poor quality of the output (Srivastava and Patel, 1994). According to Boer and Pandey (1997), a major problem in improving technology is the very small size of the average agro-processing unit, suggesting the need to integrate to achieve larger scale to be able to remain competitive.

A fourth constraint are regulations that work against agroindustry. The government typically considers processed and packaged goods as luxury items, and as a result their production is heavily taxed. There are myriad special regulations and licensing requirements for specific agroindustries, such as the Milk Product Order for the dairy industry. These policies create disincentives for investment in higher value-added agro-processing.

A final constraint is lack of finance. The financial institutions in India are mainly geared to lending for fixed capital requirements, while agroindustry, as shown in the analysis above, has a large requirement of working capital. Banks lend working capital, if at all, at higher interest rates than other capital loans.

AGROINDUSTRY MODELS IN PRACTICE OR PROPOSED IN INDIA

The challenges arising from the above constraints to the agroindustrial sector and the need for its continued growth to contribute to rural and small farmer development call for innovative models of agroindustry organization in India. Several models have been tried and need to be evaluated to provide lessons for India and elsewhere in the developing world.

Whatever the nature of the model, there are a few key success factors: (1) creation of incentives for farmers to produce the required quantity and quality of raw materials, and supply the produce as stipulated in the contract (rather than sell elsewhere); (2) provision of required farm inputs and technology and clarification of who bears what costs and risks; (3) access to high quality processing technology; (4) attention to changing consumer demand through effective market intelligence; (5) attraction of investment capital; and (6) attention to issues of ownership, organization, management, and quality control.

Cooperative Organization Model: AMUL

One model that has been successful in certain types of agroindustry (such as dairy and edible oil) is the AMUL Cooperative Model also called the Anand Pattern Model. This model evolved out of a successful dairy cooperative movement in the Chaeta district of Gujarat state. Today the dairy cooperative has a national membership of nine million, of which 21% are landless and 66% are small and marginal farmers. The farmers own the agroindustry, as stipulated by the cooperative by-laws. Cooperatives are organized in a three-tier structure, with primary cooperatives at the village level, a cooperative union at the district level, and a cooperative federation at the state level. Broadly, the village cooperatives buy the produce from the farmers, the district union transports and processes the product, and the federation markets the final product and handles strategic planning and investment. The cooperative is governed by a rotating board of farmer-elected representatives, but is run by a team of professional managers. The cooperative also undertakes agricultural/dairy extension and provision of veterinary and other services.

The cooperative model benefits from committed suppliers because they are members, and relatively low intermediate input costs for that reason. The model in turn benefits the members with employment and incomes from primary production and value-added. A major problem faced by the cooperatives is their need for qualified, committed leadership provided in voluntary governing boards. An elected board often becomes highly politicized, detracting from the goals of the cooperative and compromising good business practices. Further, antiquated laws governing cooperatives invite government interference and prevent use of financial markets for raising equity capital, thereby constraining growth.

Government Organization Model: HPMC

In this model, the government or a government-owned corporation is the major player. One of the well-known examples of this is the Himachal Pradesh Fruit Processing and Marketing Corporation (HPMC). The corporation is fully owned by the government and is managed by government staff. The corporation sets up a network of infrastructure and processing facilities including produce collection centers, warehouses, cold storage, and processing plants. The produce is purchased from the farmers at announced prices. It is then stored, processed, and marketed nationally by the government corporation. The marketing of fresh produce is the domain of wholesalers, and wholesale and retail remain private. The HPMC has set up two collection centers, three warehouses, and five cold storage in the state of Himachal Pradesh, principally for apples. It has also set up cold storage in the metropolitan cities of Delhi, Mumbai, and Chennai.

Even though the HPMC was fairly successful at one time, reports indicate that it has not been able to sustain this success (Vaidya, 1996). Lately, it has been unable to either attract enough farmer suppliers or expand distribution beyond its own outlets. Government ownership has the advantage of assuring public funds for infrastructure investments, but the down-side is that bureaucrats manage the enterprise, and they often lack business skills and are transferred at the whim of changing governments; moreover, they are accountable to their superiors but not to farmers or consumers. They demonstrate little commitment to procure from small farmers, on the one hand, and to meet dynamic marketing demand, on the other, blocking the long-term success of the enterprise.

The Model of Private Multinational "Partnering" with Farmers: PepsiCo

This model involves backward integration by a private company with strong marketing capabilities and products and brands that are established. The model has been tried by Pepsi Foods in India in the setting up of a tomato processing plant at Zahura in Hoshiarpur district in Punjab in 1989. By 1994, 350 farmers cropped more than 2700 acres, and 650 tonnes of tomato were processed per day (Gulati et al., 1994). Contracts for production and procurement of tomatoes were made with small farmers, where the contracts were morally rather than legally binding. The company invested in building relationships of trust with the farmers through their commitment to providing extension services and production inputs. It brought in experts and promoted the use of appropriate farm technology and varieties with the farmers, bringing to bear research and know-how from its global operations. Seedlings were provided to the farmers, and the planting was scheduled and programmed using computers. The best available technology was used in processing, and the company used its strong marketing capabilities and networks for selling quality products.

This model involved not simply procurement or contract farming, but devel-

oped a mutually beneficial partnership between the agroindustry and the farmers. This entailed substantial financial losses of Rs. 40 million per year for the first three years, followed by profitable years thereafter. This model can result in excellent benefits for small farmers, on a fairly limited scale, but it requires a long-term view and commitment from the company, and willingness by the enterprise to absorb substantial start-up costs and initial losses.

Multinational-Local Firm Partnership with Corporate Farming Model: Del Monte

This is a model proposed in Gujarat State involving a joint venture between Del Monte, a multinational, and an Indian soft drink manufacturer for manufacturing a variety of food products. It is envisaged that corporate farming will be undertaken by the joint venture to obtain 25% to 30% of the raw material requirement, and the rest will be obtained through contract farming. The identification and allotment of farmland is under consideration by the government of Gujarat. The model is still not implemented.

The major drawback of this model would be the availability of land for corporate farming. The land laws in India presently permit only farmers to own agricultural land, and this too is limited by land ceilings established to prevent the exploitation of small farmers by large landlords. Corporate farming also requires formal employment of farm labor under current law. It is to be seen whether such farming will be cost-effective compared to the economies of cheap family labor available on family farms. Another potentially conflictive issue is the sharing of ownership, control, management, and returns between the multinational and the national partners.

Value Addition Center Model

The Gujarat Agro Industries Corporation has recently proposed a concept of the Value Addition Center (VAC). The VAC is conceived of as a hub of activities for pre- and post-harvest management of agricultural produce (see Figure 2). It would function as an anchor activity for regional rural development, providing know-how, technology, inputs and market access to small and medium farmers in Gujarat. Further, VACs would serve as private-public sector "partnership nodes" around which different types of contract farming can be organized, with the government or associated NGOs acting as intermediaries to ensure transparent transactions.

A completely operational VAC would provide an integrated chain from farm to the market, reducing the number of intermediaries at several stages (e.g., consolidator, commission agent, semiwholesaler, see Figure 2). As such, the VACs would successfully compete with the current monopolistic trader network to access raw material by offering higher prices and an integrated package of

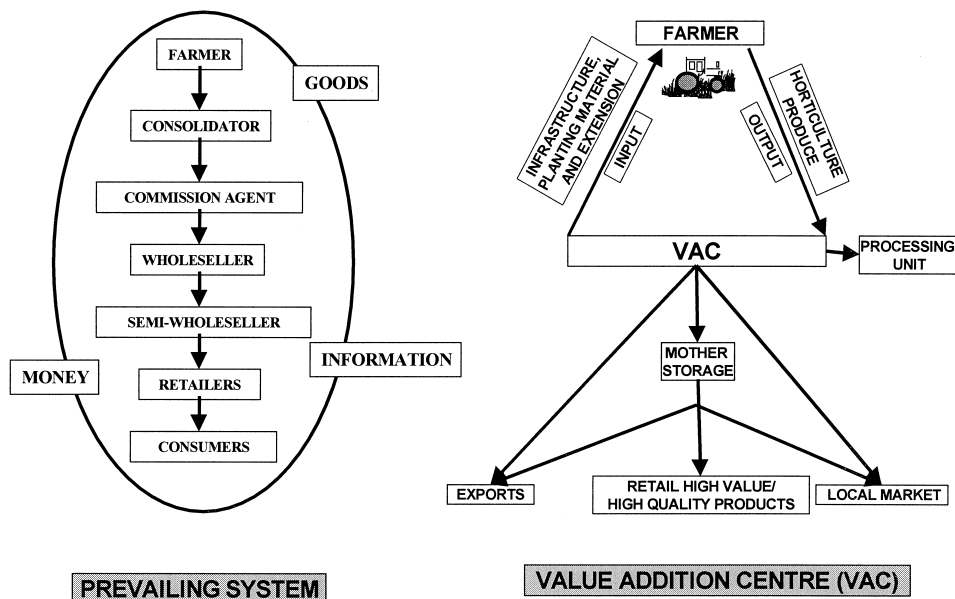


Figure 2. Value Addition Center Concept.

services and guarantees to the farmers. Government investment would be required for R&D, infrastructure, risk spreading, and initial transaction costs associated with pulling partners together. As a concept, the VAC is very attractive, but its organizational requirements are high, perhaps too high for it to become operational in Gujarat.

Assessment

If the development objectives of agroindustrial growth are to be served, small farmers must benefit from this growth, and the landless should at least benefit indirectly. However, this depends substantially on the nature of the organization and the commitment of the agroindustry to their involvement as partners. It also depends on the bargaining power of the small farmers within the models and structures that are created. The cooperatives have often done better in bringing benefits to the rural poor, sometimes with the assistance of NGOs as intermediaries. Supply contracts with small farmers are rarely enforceable in India, as elsewhere in developing countries, and remain moral in nature. Therefore, to make contract farming successful, much depends on the development of longer term relationships between agroindustry and farmers through transparent contract terms, fair pricing, effective extension, and good marketing. This is possible even for private agroindustry firms as shown by the PepsiCo model.

CONCLUSIONS AND IMPLICATIONS

Agroindustry have been given significant priority in economic development in India. Mahatma Gandhi's emphasis on developing village-based agroindustry in the movement for independence marked the beginning. Is the priority given to agroindustry justified today? The study finds that the agroindustrial sector in India contributes a large share of overall employment in industry as well as value addition and income generation. Its continued role in promoting development, and reducing poverty, will depend on its capacity to contribute to small farm income and rural employment, particularly among the landless poor.

Managerially, one of the major challenges lies in organizing sustained production and procurement from large numbers of small farmers. A partnering approach appears to be most promising in overcoming multiple constraints. It can be implemented either through building cooperative organizations, or by building confidence and trust through a mutually beneficial business relationship involving private enterprise and farmers. In both cases, and with other successful models, the government must play a facilitating role through enabling policies, regulations, financing options, and research and development.

There is a need for new indigenous models to emerge for the organization of agroindustry. Government models alone do not show a good record of performance. The AMUL cooperative model is one promising model that brings benefits to small farmers and gives them ownership of the enterprise. However it needs to overcome political, legal, and managerial limitations. The PepsiCo model that involves cogent backward integration by a private company to the farmers from a strong product market offers another alternative. However, it requires long-term commitment and financial strength with limited scope for affecting large numbers of rural poor. It is critical that alternative agroindustrial models are encouraged to emerge and receive strong government backing, especially those models that contribute positively to rural employment, poverty alleviation.

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NOTES

1. The Annual Survey of Industries is conducted by the Central Statistical Organization of the Ministry of Planning. It covers registered factories employing more than 10 workers. Thus nonregistered factories and those employing less than 10 workers are not covered. Factories employing more than 100 workers are covered by a census, and the remaining are covered through a sample survey.

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