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Role of Rural Women in Small Scale Agro-Processing Sector - An Economic Analysis of Samridhi Mahila Processing Co-operative Society in Himachal Pradesh

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I

INTRODUCTION

Agriculture, being the largest sector of the Indian economy, cannot remain isolated from the ongoing economic reforms and structural adjustment provisions enshrined in the WTO agreements to which India is a signatory. However, agriculture-cum-primary producing economy has to face the volatility of international prices for its exports. India is the second largest producer of fruits and vegetables in the world but only 1.5 per cent of fruits and 0.5 per cent of vegetables are processed as against 70 per cent in Brazil. India loses over 30 per cent of its produce of fruits and vegetables annually that can be averted by creating proper processing infrastructure. In this context, agro-processing not only stimulates value addition but also generates direct and indirect employment, particularly in rural areas of the country to absorb the surplus workforce (Acharya, 1997 and Subrahmanyam, 1995). Value addition through modern processing industries help in generating further rounds of increase in income and employment from which the farmers would also benefit through better returns (Rao, 1994). Moreover, the symbiotic relationship and linkage between agriculture and agro-processing industries not only prevent the proverbial rural exodus but also promote overall development and rural-urban interaction (Shivakumar *et al.*, 1999). It has been estimated that one job is created for investment of every Rs. 5,000 in processing units, beside six others in allied activities like raw material production, storage, transport, packaging, etc. The capital employment ratio in the processing units is also quite favourable to the labour intensive methods of operation that the highly populated country like India needs so badly to provide employment opportunities to her masses, particularly the rural poor (Srivastava, 2000). However, the success of agro-processing industries has been hindered by a variety of problems relating to operational efficiency, cost effectiveness and infrastructures, especially in backward and hilly areas (Jairath, 1996 and Sharma, 1996). The small scale agro-processing industries are of great significance for industrially backward hilly states like Himachal Pradesh, where the production of

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fruits and vegetables is increasing over the years and where the scope of establishing big industries is quite limited particularly when about 67 per cent of its working force depend on agriculture alone. Around 84 per cent of the land holdings in the state are marginal and small and the holding size is becoming alarmingly small over the years. Further, farming by and large is dominated by the feminised workforce where women play a dominant role in farming, household management and the overall social milieu as the majority of men-folk have migrated to urban areas in search of wage work jobs. There exists high level of disguised unemployment and low earning opportunities for the rural women. In this backdrop, the socio-economic empowerment and capacity building of the hitherto neglected hill women folk through small scale agro-processing units assumes special significance especially in the wake of economic reforms and structural adjustment programmes in the country.

The establishment of an agro-processing co-operative unit that too in resource-poor *Changar* (dry) areas of Kangra and Chamba districts in Himachal Pradesh is, thus, a welcome step to ameliorate the socio-economic status of rural women. This co-operative society came into being in June 1996 with a vernacular nomenclature 'Samridhi Mahila Co-operative Society' (SMCS) which was registered on November 11, 2000. This agro-processing unit promises collective prosperity to women processing groups (WPGs) in its ambit by creating and sustaining income generation through agro-processing of locally available fruits from forests and common lands. The present investigation was undertaken to examine the progress of Samridhi Mahila Co-operative Society over time through its organisational set up, growth and performance alongwith the financial overview so that the 'Samridhi' model of development may serve as a lighthouse for replicating in other regions of Himachal Pradesh in particular and the country in general.

II

METHODOLOGY AND DATA

The data for the present study have been collected from SMCS and its affiliated WPGs located in different regions of Kangra and Chamba districts. It was indeed the technical input and expertise of Indo-German *Changar* Eco-Development Project (IGCEDP) that gave birth to SMCS to utilise the vast untapped fruits from mixed forests and common lands for income generation through value addition. The primary data for this research paper were collected from the newly established agro-processing unit 'The Samridhi Mahila Cooperative Society' (SMCS) located at Palampur in Himachal Pradesh. The information on organisational set-up, processing, functioning, investment and wage distribution were gathered from the representatives of women production groups (WPGs) located in different regions of Kangra and Chamba districts. The data were tabulated and analysed systematically to draw plausible inferences. The percentages and ratios were computed to examine the efficiency and financial viability. The following financial ratios were worked out to examine the economic viability of SMCS:

Equity ratio = Total assets/total liabilities,
Solvency ratio = Current assets/current liabilities,
Working ratio = Working assets/(current + medium-term liabilities),
Capital turnover ratio = Gross profit/total turnover,
Sales turnover ratio = Gross profit/total sales,
Fixed ratio = Fixed assets/total assets.

III

RESULTS AND DISCUSSION

Evolution of SMCS and Organisational Set-up

The Shivalik region of Himachal Pradesh is the rich repository of fruit trees such as *amla*, mango, *dhiun*, *harhar*, *bahera*, citrus, etc., growing in abundance on forests and village common lands in Changar (dry) regions. With the help and expertise of Indo-German *Changar* Eco-Development Project (IGCEDP), the self-help groups or Women Processing Groups (WPGs) were established in different regions and federated into a co-operative structure with a vernacular name, "Samridhi Mahila Co-operative Society (SMCS)". Before the establishment of SMCS, the village communities used limited quantities of these fruits for processing home products while most of the surplus fruits were wasted. SMCS took advantage of this opportunity and instead started using surplus fruits for income generation and self-employment in the backward dry areas where other income and employment avenues were scanty.

The SMCS is being run purely on democratic principles. At the apex level, the president and vice-president of SMCS are elected for a period of five years by the general body of all the registered members of WPGs (Figure 1).

There were 27 WPGs and 248 women members located in different locations/regions of Kangra and Chamba districts during the year 2002-03 (Table 1). However, there existed only one group with 16 women members when the SMCS first came into being. Impressed with the performance and success of the unit, more and more WPGs are now joining SMCS. The processing activities carried out by WPGs and SMCS are displayed in Table 2. The SMCS is responsible for planning, supply of inputs and procurement of products from all WPGs, final processing, marketing and distribution of wages to women members/workers.

The meetings of representatives of WPGs are held every month to discuss the processing and marketing strategies. Each WPG has 10-12 women members at the village level with an elected *Pradhan* and *Up-Pradhan*. These members collect fresh fruits during the season from forest and common lands. After cutting, chopping, drying and initial mixing, the semi-processed product are collected at the main yard of SMCS for further processing, packaging and marketing. The WPGs, in turn, receive wages in accordance with the quantity of semi-processed products prepared

by them. The WPGs also save part of their wage earnings to supplement the working capital. Each member of WPG contributes Rs. 250 towards share capital of SMCS.

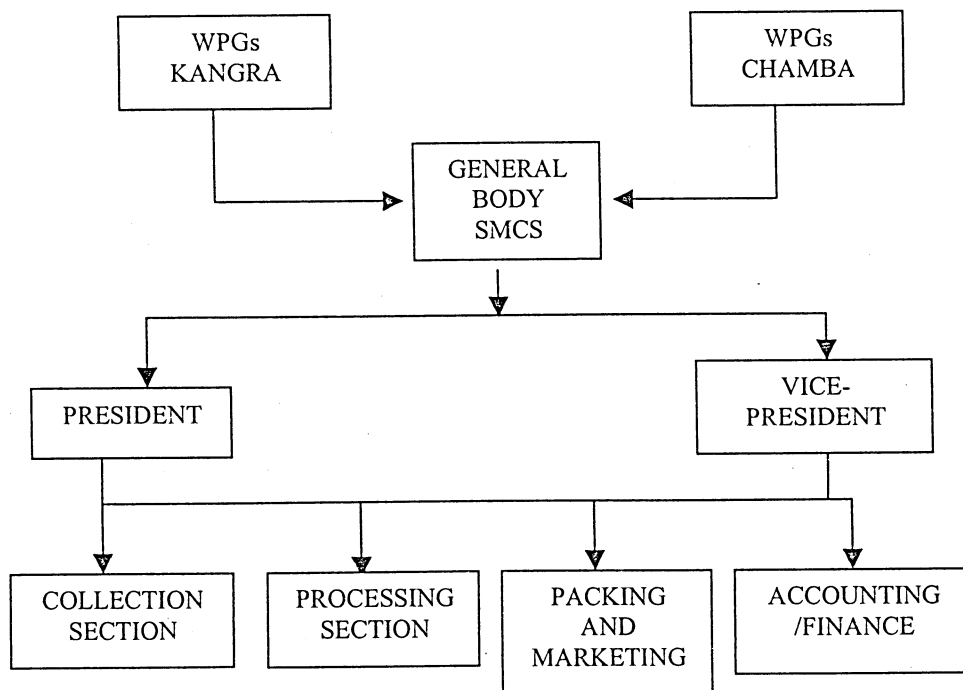


Figure 1. Organisational Set-up of SMCS

TABLE 1. WOMEN PROCESSING GROUPS (WPGS) OF SMCS

Region (1)	District (2)	Number of WPGs (3)	Number of members (4)
Dhati	Kangra	7	62
Ropri	Kangra	8	85
Dhira	Kangra	4	36
Dehan	Kangra	4	25
Bhatiyat	Chamba	4	40
SMCS (apex body)		27	248

TABLE 2. PROCESSING ACTIVITIES OF WOMEN PRODUCTION GROUPS (WPGs) AND SMCS

Activities of WPGs (1)	Activities of SMCS (2)
<ul style="list-style-type: none"> ❖ Collection of fresh fruits of mango, <i>ambla</i>, <i>dhiyun</i> and lemon from owned/ common lands. ❖ Chopping and primary processing ❖ Assembling ❖ Distribution of wages among members ❖ Maintaining accounts ❖ Participation in General Body Meetings 	<ul style="list-style-type: none"> ❖ Identification and formation of Mahila groups (WPG) in different locations ❖ Providing working assets, financial assistance and technical guidance for preparation of different products. ❖ Supervision, monitoring and co-ordination of the activities of different groups. ❖ Purchase and supply of raw material (colocasia, vegetables, chillies, garlic, ginger, condiments and spices) to WPGs at different locations. ❖ Collection and transportation of primary products from different WPG and payment of wages thereof. ❖ Assembling, final processing, testing and quality control and packaging of different products at the main centre at Palampur (Thakurdwara). ❖ Price determination, marketing and demand creation.

Processing Performance and Income Generation

The spectacular increase in the quantity of processed products and income generation and volume of sales over the years (Table 3), are indicative of the growth prospects of SMCS.

TABLE 3. GROWTH AND PERFORMANCE OF SMCS 1995-96 TO 2002-03

Year (1)	Number of members (Nos.) (2)	Processed products (kg.) (3)	Wages earned (Rs.) (4)	Sales (Rs.) (5)
1995-96	16	357	6,250	N.A.
1996-97	70	425	4,250	17,200
1997-98	85	14,605	42,166	1,22,459
1998-99	105	12,886	2,20,070	5,23,477
1999-2000	151	18,775	2,25,856	15,31,248
2000-2001	180	23,873	4,16,156	17,26,671
2001-2002	184	19,986	2,13,092	16,32,421
2002-2003	248	35,973	4,08,864	22,46,724

Source: Office of SMCS, Thakurdwara, Palampur, Himachal Pradesh.

In the initial year, the society started with a modest beginning of 16 members, produced 357 kgs of processed products, and earned just Rs. 6,250 as wage income. However, the data for sales of products were not available for the first year, whereas, the sales during the second year of establishment amount to Rs. 17,200. Hereafter, SMCS has registered steady progress and remarkable growth. During 2002-03, there were 248 women members with a total processed products of 35,973 kg resulting into total wage earnings to the tune of Rs. 4,08,864. The total sales increased manifold

from merely 17,200 in 1996-97 to a record level of Rs. 22,46,724 during 2002-2003. This clearly demonstrates a consistent growth in membership, processing, volume of sales and wages earned over the years resulting in prosperity to the erstwhile economically backward women folk of the resource poor *Changar* region, who joined SMCS.

Production of Different Processed Products

The processing of different products at various WPG centres during the year 2000-01 has been depicted in Table 4. It can be seen from this table that there were four production centres located at Dhati, Ropri, Dehan (all in Kangra) and Bhatiyat (Chamba). The data revealed that about 61 per cent of the total pickles production came from Dehan centre. Ropri centre contributed maximum to the production of *Chutneys* while both centres at Dhati and Ropri accounted for major proportion of candies. Thus, about 24,000 kg of different products in all were produced during the year 2000-2001 by SMCS at different WPG centres in which Dehan, Ropri and Dhati contributed a major proportion while Bhatiyat has also exhibited good growth and is likely to show its full production potential in the near future. The quantity of processed products during 2002-03 has increased to a record level of about 36,000 kgs.

TABLE 4. PRODUCTION OF PRODUCTS AT WPG CENTRES DURING THE YEAR 2000-2001
(kg)

Products	Dhati centre	Ropri centre	Bhatiyat centre	Dehan and Dhira centres	Total
(1)	(2)	(3)	(4)	(5)	(6)
Pickles					
Mango	90	1,275	-	-	1,365
Amla	750	460	406	-	1,616
Dhiyun	290	-	1,095	-	1,385
Garlic	-	-	-	2,000	2,000
Chillies	-	-	-	1,495	1,495
Colocasia	-	-	-	2,335	2,335
Lemon	551	442	-	300	1,293
Date palm	-	-	-	604	604
Mixed	-	-	-	1,500	1,500
Sub-total	1,681 (12.37)	2,177 (16.02)	1,501 (11.04)	8,234 (60.57)	13,593 (100)
Chutneys					
Mango	298	1,090	-	-	1,388
Amla	707	698	438	-	1,843
Sub-total	1,005 (31.10)	1,788 (55.34)	438 (13.56)	-	3,231 (100)
Candies					
Amla	3,334 (47.30)	3,305 (46.89)	410 (5.81)	-	7,049 (100)
Grand total	6,020 (25.22)	7,270 (30.45)	2,349 (9.84)	8,234 (34.49)	23,873 (100)

Quantity processed during 2000-2001.

Wage Rates of Workers and Product Prices

The product-wise wages given to different WPG members for collection, primary processing and final prices of finished products are fixed by SMCS (Table 5). It is worth mentioning that wages were paid for collection, chopping and initial processing at WPG level while final prices were determined at the main centre of Samridhi at Thakurdwara (Palampur). It has been observed that the production costs which mainly include wages accounted for less than 20 per cent of the final price for most of the products which is due to availability of raw material free of cost and low wages. These two factors resulted in comfortable profit margin that made processed products cost-effective and competitive in the market. In addition to this, high quality, delicacy and lower prices in comparison to prices of other established firms have ensured safe entry and high sales turnover of different products processed by SMCS which gives an edge to this organisation over other competing agro-processing units in the region.

TABLE 5. PRODUCT-WISE WAGES PAID TO WPGS WORKERS AND PRICES DURING 2002-03

Processed products (1)	Wages (Rs./kg) (2)	Final price (Rs./kg) (3)	Wages as per cent to product price (4)
Pickles			
1. Mango	7.00	40.00	17.50
2. Ambla	8.00	40.00	20.00
3. Dhiyun	10.00	45.00	22.22
4. Garlic*	15.00	70.00	21.43
5. Chillies*	7.00	45.00	15.56
6. Colocasia*	4.00	55.00	7.27
7. Lemon*	15.00	45.00	11.11
8. Date palm*	7.00	65.00	10.77
9. Mixed	7.00	35.00	20.00
Chutneys			
1. Mango	10.00	45.00	22.22
2. Amla	10.00	45.00	22.22
Candies			
1. Amla	32.00	120.00	26.67
2. Galgal	32.00	N.A.	

* Excluding material cost while in other products, material as well as labour costs are inclusive.

Financial Overview and Viability of SMCS

The success story of Samridhi Mahila Co-operative Society can further be gauged through its attractive trading account, healthy balance sheet and sound financial progress. It can be seen from Table 6 that the society had a total turnover of Rs. 32,16,122 during the year 2002-03 and showed marked increase over the previous financial years. The total sales increased continuously from Rs. 15,31,249 in 1999-2000 to Rs. 22,46,724 during 2002-03. The society also earned a gross profit of Rs. 8,44,699 during 2002-03.

The financial soundness of the society can further be visualised from its promising balance sheets presented in Table 7. The society owned total assets worth

TABLE 6. TRADING ACCOUNT OF SAMRIDHI MAHILA CO-OPERATIVE SOCIETY OVER THE YEARS

Particulars	Debit				Particulars	Credit			
	31.3.2000	31.3.2001	31.3.2002	31.3.2003		31.3.2000	31.3.2001	31.3.2002	31.3.2003
To opening stock	3,30,172	5,53,886	8,38,962	7,67,109	By sales	15,31,249	17,05,265	16,32,721	22,46,724
To purchases	6,14,071	6,26,777	4,89,680	8,82,007	By closing stock	5,53,886	8,38,962	7,67,109	9,69,398
To freight charges	24,640	38,223	21,722	23,693					
To wages	3,64,260	5,78,409	3,07,258	5,17,056					
To fuel/lubricants and electricity	10,432	17,110	-	10,440					
To rent charges	27,720	54,760	51,200	-					
To packing material/labelling	2,33,288	2,41,236	1,84,343	1,55,213					
To grading and other charges	16,972	52,491	527	1,070					
To repairs and maintenance	5,769	5,865	6,005	13,785					
To consumables	4,165	4,705	1,324	1,050					
To processing charges	-	7,131	-	-					
To TA/DA (production)	-	816	-	-					
To gross profit	4,53,646	3,62,818	4,98,509	8,44,699					
Total	20,85,135	25,44,227	23,99,530	32,16,122		20,85,135	25,44,227	23,99,530	32,16,122

TABLE 7. BALANCE SHEET OF SAMRIDHI MAHILA CO-OPERATIVE OVER THE YEARS

Particulars	Assets				Particulars	Liabilities			
	31.3.2000	31.3.2001	31.3.2002	31.3.2003		31.3.2000	31.3.2001	31.3.2002	31.3.2003
A. Current Assets					A. Current Liabilities				
Cash in hand	8,300	16,367	25,131	4,250	Sundry creditors	55,300	74,520	39,682	1,38,978
Cash in bank	1,30,942	58,41	2,968	3,268	Bills payable	1,35,324	2,91,893	97,176	2,61,059
Closing stock	5,53,886	8,38,962	7,67,109	9,69,398	Samridhi welfare fund	-	46,418	16,386	-
Bills receivable	-	36,445	16,623	11,356	Saving programme of members	25,388	24,668	-	-
Sundry debtors	1,58,242	2,09,108	2,57,968	3,03,862					
Sub-total	8,51,370	11,59,293	10,69,799	12,92,134	Sub-total	2,16,012	4,37,498	1,53,243	4,00,037
B. Medium Term Assets					B. Mid-Term Liabilities				
Interest	5,127	4,928	6,015	8,991		-	3,40,000	7,09,326	11,79,388
Loans/advances	10,171	1,000	1,500	-	C. Fixed Liabilities				
Fixed deposits	20,000	20,000	2,30,886	5,48,671	Share capital	4,269	26,750	35,500	56,250
					Reserve/surplus/less /losses	9,36,660	7,36,429	7,41,937	7,30,510
Sub-Total	35,298	25,928	2,38,401	5,57,662	Sub-Total	9,40,929	7,63,179	7,77,437	7,86,760
C. Fixed Assets									
Grand Total	11,56,940	15,40,677	16,40,007	23,66,185	Grand Total	11,56,940	15,40,677	16,40,007	23,66,185

Rs. 23,66,185 as on 31.3.2003 and had substantial current assets far exceeding the current liabilities showing sound solvency position. Similarly, the nature of medium term assets (interest received, advances and deposits) revealed that these can also be converted into ready cash, if need arises, thereby further strengthening the solvency position of the society. The society rightly did not invest much in the creation of fixed assets. Similarly, less current liabilities and high net worth in terms of reserves/surpluses make Samridhi more vibrant and financially viable venture worth replicating in other agri-business units. However, the society does not own its building thereby paying more than Rs. 50,000 as annual rental charges that can be saved when the building (proposal under consideration) will be constructed.

These results were further confirmed with the help of financial ratios which are regarded as the feelers of performance in business accounting terms (Table 8). The society exhibits high equity ratio, working ratio and solvency ratio that are the indicators of sound financial viability. The capital turnover as well as sales turnover ratios were also appreciably high showing substantial profit rate over capital/sales. Moreover, the low fixed ratio was an indicator of vibrant business operation and judicious use of funds more as operational capital rather than overhead capital. The low fixed capital need can be regarded as the strength of such small agro-processing units that can be established with very low level of initial capital investment.

TABLE 8. FINANCIAL VIABILITY INDICATORS OF SAMRIDHI MAHILA CO-OPERATIVE SOCIETY

Viability indication (1)	31.3.2000 (2)	31.3.2001 (3)	31.3.2002 (4)	31.3.2003 (5)
1. Equity ratio	5.25	1.92	1.90	1.50
2. Solvency ratio	3.94	2.65	6.98	3.23
3. Working ratio	4.11	1.52	1.51	1.17
4. Capital turnover ratio	0.22	0.14	0.21	0.26
5. Sales turnover ratio	0.30	0.21	0.31	0.38
6. Fixed ratio	0.23	0.23	0.20	0.22

Marketing and Demand Creation

Prompt marketing of processed products and realisation of sales is the major aim of SMCS so that the cash earnings from the sales proceeds can be distributed among WPGs for carrying out further processing production programmes on a sustainable basis. The executive committee of SMCS alongwith the patronage of Himachal Pradesh Marketing and Processing Corporation (HPMC) and some NGO consultants are assisting in exploring new market outlets and expanding the business operations of SMCS not only within the state of Himachal Pradesh but in other states also.

There were four main channels patronised for the sale of different products:

- I. SMCS → Consumers
- II. SMCS → Retailers → Consumers
- III. SMCS → Distributors/Wholesalers → Retailers → Consumers
- IV. SMCS → HPMC → Consumers

The III and IV channels are the major channels through which about 70 per cent of the processed products were being marketed. The direct sale to consumers that accounted for about 15 per cent of the total sales was being done by the Samridhi Mahila members themselves either from their main processing centre or through direct selling in major market/consuming centres in Palampur, Kangra, Mandi and Shimla towns. The Government of Himachal Pradesh is providing infrastructure and sales outlets for products of SMCS through HPMC at its various sale centres. However, there is a need to explore new market outlets to expand the volume of sales.

Prospects and Challenges Ahead

The environmental friendly, cheap methods of preparation, high quality, homely delicacy/taste and low cost are the major features of products of SMCS that find ready markets. The society has earned enough goodwill within the state and elsewhere where the consumers are fond of its irresistible appetising taste of pickles, *chutneys* and candies. Samridhi is planning to diversify its processing by including a wide range of products for which proper training is needed. For this, the government should arrange the visits/trainings of women representatives in various pioneer institutions like Anand Dairy, Mahila Udyog (Lijjat Pappad), Hamdard, Indana agro-products, Zandu Pharmaceutical Industries to enhance their management skill, product quality and marketing expertise.

However, SMCS would require constant encouragement and patronage of the development agencies, financial institutions and NGOs. Proper rules and by-laws should be formulated to ensure continuity of the organisational structure and strengthen the financial management. For this, innovative and enterprising women members in the existing structure should be trained as a managing director and a secretary of SMCS. The efficient marketing and sales promotion strategies need to be devised. There is much scope to enhance the resource base and processing capacity by inducting more of WPGs in various locations. More and more WPGs are interested to join 'Samridhi' and the day is not far off when this humble institution will grow into a giant co-operative processing venture in the state.

There is also need for the construction of building to save substantial expenditure on account of rent paid for hired accommodation. The SMCS should collaborate with different developmental agencies for ensuring sustainable management of natural habitats and groves of fruit trees to increase production. There is also need to diversify the products and explore new market outlets in different parts of the country.

IV

CONCLUSIONS

The performance of SMCS, which is a small scale agro-processing unit in Himachal Pradesh clearly brings home the fact that collective strength, institutional

support and missionary zeal can empower the womenfolk and usher in prosperity even in economically backward and resource-poor *Changar* (dry) region in Kangra and Chamba districts. The capacity building and empowerment of rural women through small scale agro-processing units may put aside the misnomer that women are dependent and can contribute nothing tangible to economic development. The SMCS is surely acting as a lighthouse for the welfare of those womenfolk in the country majority of whom are leading miserable life full of discrimination, indignity and drudgery. The fruit processing co-operative was found to be on a sustained growth path with constantly increasing business turnover, sales and profits. The healthy and sound financial ratios were the pointers of success that can be further improved through increasing processing capacity, diversifying the range of processed products, inculcating skilled management and financial prudence and expanding market avenues. The leadership qualities, confidence/capacity building, business acumen and educational values that Samridhi has inculcated among the hapless and backward womenfolk must be encouraged and emulated to change the face of rural economy.

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ijae-605	July-Sept	2003	Summaries	589	635
----------	-----------	------	-----------	-----	-----

Summaries

		Page
1.	Economic Analysis of Jaggery Preparation with Particular Reference to Athani Village of Erode District, Tamil Nadu	<i>S. Lakshmanan</i> 594
2.	Solving the Problems Encountered in Structuring the Sustainable Agro-Processing Industries	<i>P.S. Shehrawat and V.K. Makhija</i> 594
3.	Building Agribusiness-Farmer Linkages: State-led vs. Corporate-led Models in India	<i>Sukhpal Singh</i> 595
4.	A Comparative Study of Processing of Chilli in Jodhpur District of Rajasthan	<i>D.C. Pant and Girdhari Lal Meena</i> 596
5.	Assessment of Energy and Cost Trends for Pulse-Processing Sector in Jabalpur, Madhya Pradesh	<i>C.L. Thakur and V.C. Singh</i> 597
6.	Cassava Starch Industry in India: SWOT Analysis	<i>T. Srinivas and M. Anantharaman</i> 597
7.	Impact of Mango Processing on the Income of the Primary Producers - A Case Study	<i>Sarada Banerjee and G.D. Banerjee</i> 598
8.	Infrastructure Development for Agro-Processing Co-operatives in Maharashtra: An Ex-Post Evaluation	<i>Deepak Shah and K.G. Kshirsagar</i> 599
9.	Structure of Agro-Industries in Uttar Pradesh: Opportunities and Challenges	<i>R.K. Singh, Govind Babu and Babu Singh</i> 599
10.	Mustard Processing Industry in Bhind District of Madhya Pradesh: A Cost-Return Analysis	<i>Shailendra Bakshi, Sunil Nahatkar and Hariom Sharma</i> 600
11.	A Profile of Fruits and Vegetables Production in the North-Eastern Region and Emerging Trends and Opportunities for Post-Harvest Management	<i>Binodini Sethi</i> 601
12.	Potential of Kokum Processing for Employment and Income Generation - A Case Study	<i>V.A. Thorat, S.N. Tilekar and S.S. Bhosale</i> 602

		Page
13.	An Economic Analysis of Small Scale Agro-Processing Sector of Arhar and their Future in District Kanpur Nagar, Uttar Pradesh	602
	<i>D.S. Singh, Narendra Kumar Gupta and Anjani Kumar Singh</i>	
14.	Economic Analysis of Small Scale Agro-Processing - A Case Study of Pickle Making Unit in Varanasi	603
	<i>Chandra Sen and Mamta Baranwal</i>	
15.	Contract Farming as a Backward Linkage for Agro-Processing - Experiences from Punjab	603
	<i>P. Satish</i>	
16.	Problems and Prospects of Fruit Processing in Andhra Pradesh	604
	<i>G.P. Sunandini</i>	
17.	Growth of Fruits and Vegetables Production and Processing Industries in the Era of Liberalisation	605
	<i>G.G. Joshi, D.S. Nawadkar, B.K. Mali and H.R. Shinde</i>	
18.	Economic Analysis of Sugarcane Processing for Gur and Cane Juice	605
	<i>P.S. Rao and C.P. Singh</i>	
19.	Food Processing Industries in the North-East India: Status and Prospects	606
	<i>Saundarijya Borbora and Ratul Mahanta</i>	
20.	Fruits and Vegetable Processing Industry in Assam - An Economic Analysis of Three Tiny Fruits and Vegetable Processing Units	607
	<i>K.K. Barman and Namita Devi</i>	
21.	Economics of Marketing and Processing of Pulses in Banda District of Bundelkhand Region (Uttar Pradesh) - A Case Study	607
	<i>R.B. Singh, Ram Roop Kushwaha, Keshwa Prasad, Rajesh Kumar and Sant Ram</i>	
22.	Emerging Trends in Fruits and Vegetables Processing in India	608
	<i>Brahm Prakash, D.K. Sharma and V.P. Tyagi</i>	
23.	Agro-Processing Industries in the Era of Trade Liberalisation: A Few Reflections	609
	<i>M.S. Kallur and K.A. Rasure</i>	
24.	Economics of Processing of Soybean in Sehore District of Madhya Pradesh	610
	<i>K.N.S. Banafar</i>	

		Page
25.	Economic Analysis of Agro-Processing Sector in Karnataka	610
	<i>M.B. Belavatagi and B.J. Javali</i>	
26.	Economics and Potential of Apple Processing Industry in Kashmir Province of Jammu and Kashmir State	611
	<i>F.A. Shaheen</i>	
27.	Profitability Potential of Different-Sized Rice Mills	612
	<i>P.P. Pawar, R.B. Hile, B.S. Kakad and D.B. Yadav</i>	
28.	An Economic Analysis of Processing of Pulses in Durg District of Chhattisgarh	612
	<i>A.K. Gauraha, R.S.L. Srivastava and P. Mathur</i>	
29.	Agro-Processing Industries in Haryana: Growth in Output, Employment and Capital	613
	<i>K.S. Suhag, S.K. Goyal, K.K. Kundu and Vivek Bansal</i>	
30.	Growth of Food Processing Industry in India	614
	<i>D.K. Bharti, L.S. Gangwar and Sandeep Kumar</i>	
31.	Impact of Sugarcane Processing Industry on the Income of Primary Producers in Haryana	615
	<i>Naresh Nain, R.K. Khatkar and V.K. Singh</i>	
32.	Role of Agro-Processing Industries as Backward Linkage in Farming Local Non-Agricultural Labour Employment, Wage Earning and Anti-Distressed Sale in Chambal Division of Madhya Pradesh	615
	<i>A.M. Jaulkar, V.N. Singh and J.S. Raghuvanshi</i>	
33.	Impact of Agro-Processing Plant (Milk Processing Plant, Gurdaspur) in the Post-Economic Reforms Era: A Case Study	616
	<i>G.S. Ghuman and J.S. Chawla</i>	
34.	Food Processing - Potential, Constraints and Requirements	617
	<i>Chaya Degaonkar</i>	
35.	Economics of Processing of Gram and Emerging Problems: A Case Study	617
	<i>K.G. Sharma and M.C. Athavale</i>	
36.	Emerging Problems of Soybean Processing in Indore District of Madhya Pradesh	618
	<i>S.K. Gupta and A.M. Mishra</i>	

		Page
37.	Processed and Non-Processed Fish Exports: Trends, Status and Prospects of India in World Fish Trade	619
	<i>Pradeep K. Katiha, Chinmoy Chakraborty and Indradeep Chakraborty</i>	
38.	Role of Agro-Processing Co-operatives in the Rural Economy - A Case Study	619
	<i>R.D. Khodaskar</i>	
39.	Recent Trends in Export of Agro-Processed Products and Changes in Pre- and Post-Liberalisation Period	620
	<i>Amit Kar</i>	
40.	Impact of Milk Processing on Small Farms: A Case Study	620
	<i>Ashutosh Shrivastava</i>	
41.	Economics of Processing of Tapioca in Salem District of Tamil Nadu	621
	<i>S.D. Vaishnavi, P. Raghu Ram, M.S.M. Raju and T.V.N. Sastry</i>	
42.	Growth, Structure and Prospects of Agro-Processing Industries in India: Is there Improvement since the Economic Reforms?	622
	<i>N.V. Namboodiri and Vasant P. Gandhi</i>	
43.	Income and Employment Generation Potential of Fruit Processing Industries in Tamil Nadu	622
	<i>P. Nasurudeen and N. Mahesh</i>	
44.	Economic Performance of Food Processing Industries in Karnataka	623
	<i>S. Lakshmikanthamma</i>	
45.	Agro-based Oil Processing Industries in Raipur District of Chhattisgarh: Strengths and Weaknesses	623
	<i>V.K. Choudhary and N.R. Lalwani</i>	
46.	Economic Analysis of Public and Private Sector Seed Processing Plants in Haryana	624
	<i>K.N. Rai and O.P. Chhikara</i>	
47.	An Economic Analysis of Agro-Based Industries in Haryana	625
	<i>S.P. Singh and R.K. Grover</i>	
48.	How to Strike Successful Backward Linkages with Primary Producers? Lessons from Gherkin Experiment	625
	<i>T. Ramesh and C.P. Gracy</i>	
49.	Prospects of Food Processing Industry in West Bengal	626
	<i>K.K. Bagchi</i>	

		Page
50.	An Economic Analysis of Small Scale Pulses Processing Sectors	626
	<i>P.G. Desale, J.T. Dorge, K.S. Birari and V.P. Thakar</i>	
51.	Economic Analysis of Processing of Lentil and Constraints to Future Development of Agro-Processing Units in Central Madhya Pradesh	627
	<i>P.K. Awasthi, Deepak Rathi and J.K. Gupta</i>	
52.	Economics of Mentha Oil Processing in Barabanki District of Eastern Uttar Pradesh	628
	<i>J.P. Singh and Janardan Singh</i>	
53.	Production Performance and Processing of Cashewnut in Goa State: An Empirical Analysis	628
	<i>S.P. Gupta and D.S. Prasant</i>	
54.	Cashewnut Shell Liquid (CNSL) Extraction Unit - A Promising Venture in Agro-Processing	629
	<i>G. Ramanathan and K.R. Sundaravaradarajan</i>	
55.	Income and Employment Generated through Processing of Paddy in Rajasthan	630
	<i>J.D. Sharma and S.V.S. Machara</i>	
56.	Performance of Dairy Industry in Post-Liberalisation Period	631
	<i>Sarvesh Kumar and Sirohi Smita</i>	
57.	Promotion of Livestock Processing in the Context of Globalisation	631
	<i>Vinod Kumar</i>	
58.	A Model for Determining the Number and Location of Turmeric Processing Plants	632
	<i>K. Suseela, R.V. Sujatha and Y. Eswara Prasad</i>	
59.	Backward Linkage Effect of Nijjer Agro-Foods Limited on the Income and Employment of the Farmers of Punjab	633
	<i>Tarvinder Singh Chahal, Harwinder Singh Judge and Harpreet Singh Chahal</i>	
60.	India Fruits and Vegetables Export Under WTO Regime	633
	<i>B.R. Atteri, Puran Chand and Roshan Lal</i>	
61.	Income and Employment Effects of Small-Scale Agro-Processing Activities	634
	<i>K.C. Badatya</i>	
62.	Sanitary and Phyto-Sanitary Measures and their Implications for Indian Dairy Industry	635
	<i>A.K. Chauhan and N.K. Verma</i>	

Economic Analysis of Jaggery Preparation with Particular Reference to Athani Village of Erode District, Tamil Nadu

S. Lakshmanan*

The main objectives of the paper are to work out the cost of manufacturing jaggery and to analyse the marketing and other related problems in Athani revenue village of Erode district in Tamil Nadu. For the purpose of analysis 25 medium farmers who have land of an average of 4 acres and who are cultivating sugarcane as a major crop have been randomly selected during the year 2003. Personal interview method has been used to collect the required information from the farmers. The study revealed that the jaggery manufacture in the small scale processing units is more suitable because it is economically viable. Even though profit may be higher in sending raw cane to the sugar mills, the sample farmers in Athani village prefer jaggery manufacture because the sugar mills do not make the payment immediately and huge amount of arrears is pending. Therefore, owing to the delay in payment, the farmers cannot afford to spend for agricultural operations in the coming year. Seasonal demand for jaggery influences the prices of jaggery. As there is heavy demand for jaggery from the North India particularly Gujarat and Maharashtra the Athani farmers in Tamil Nadu are more happy about the good price they receive for jaggery. Hence small scale agro processing jaggery units may be encouraged in Athani village of Erode district, Tamil Nadu.

Solving the Problems Encountered in Structuring the Sustainable Agro-Processing Industries

P.S. Shehrawat and V.K. Makhija[†]

A study was conducted in four industrially leading districts of Haryana to assess the problems encountered by the entrepreneurs to establish their small agro-processing economically viable units. A total number of 120 entrepreneurs were interviewed by constructing a well-structured interview schedule. For measuring the seriousness of the problems, a schedule was developed containing a number of statements explaining the technological, institutional and financial problems after thorough discussions with the entrepreneurs and officials of the department of industry. The intensity of these problems were measured on a three-point continuum rating scale ranging from very serious, serious and not so serious and a weightage of 3,2,1 were assigned, respectively.

The study revealed a technological gap between different institutions and entrepreneurs. Lack of specialised skill to the entrepreneurs, non-availability of improved

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technology, outdated technology, non-availability of technology in time, were perceived as other serious technological problems by entrepreneurs. The study also observed that lack of co-operation and co-ordination among different developmental agencies and poor working of various institutions related to entrepreneurship such as SISIs, KVICs, EDIs and DICs were encountered as very serious institutional problems. The study further predicted that problem in procuring fixed capital as well as working capital from different agencies and lack of sufficient working capital constituted the very serious financial problems. The study suggests that the latest technology developed by the research institutions should be effectively communicated to fill the gap through organising seminars and conferences of the potential entrepreneurs. Recent developed technologies can be introduced to the entrepreneurs through organising exhibitions and mini-technological fairs. Improved research based technologies should be transferred rapidly to the entrepreneurs. Further entrepreneurial institutions should work effectively for providing the needful scientific techniques to entrepreneurs frequently. There is need to strengthen the network of these financial institutions to provide the credit facilities in time and in sufficient amount without any delay to the entrepreneurs.

Building Agribusiness-Farmer Linkages: State-led vs. Corporate-led Models in India

Sukhpal Singh*

In the emerging environment of reduced role of the state in agricultural marketing and input supply, due to the reduction of subsidies and the increasing space being provided to the private sector under liberalisation and globalisation policies, it becomes imperative to explore the role of the corporate agribusiness sector in building linkages with the farmers. There have been a few experiments by the state and the corporate agribusinesses in India in the recent past to build such linkages in commodity chains. This paper examines a case of state-led contract farming in Punjab in order to arrive at a more sustainable model. It also discusses individual grower-based and group-based contract farming systems promoted by the corporate agribusiness firms. The emerging model of linkage building, i.e., the agri-service provider, is analysed in detail. It is found that the state-led model may not be sustainable due to the structural limitations of the state agencies in performing business functions. On the other hand, contract farming and consortium approaches adopted by some of the agribusiness companies and agri-service providers are more suitable and sustainable as they promote direct linkage with the growers. The consortium approach combines the strengths of various agribusiness players. The paper concludes by suggesting some strategies to make the existing models of agribusiness linkages stronger and more sustainable in terms of the state acting as a facilitator and agribusinesses being more farmer-friendly.

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A Comparative Study of Processing of Chilli in Jodhpur District of Rajasthan

D.C. Pant and Girdhari Lal Meena[†]

In this paper an attempt has been made to examine the viability of and to estimate the employment generated by different sizes of chilli processing units in Jodhpur district of Rajasthan. Jodhpur district occupies first position in terms of both area (10.67 thousand hectares) and production (9.10 thousand tonnes) which is 28.37 per cent of the total area and 21.27 per cent of the total production of chilli in the State. Among all the markets of the district, Jodhpur market was purposively selected on the basis of highest chilli arrivals (50,775 quintals during 2000-01) and maximum number of chilli processing plants, i.e., 59 out of 107. The processors of Jodhpur market were classified into three categories on the basis of per day capacity to process the chilli, viz. small units (capacity upto 5 quintals per day), medium units (capacity 5-10 quintals per day) and large units (above 10 quintals per day). From each category, four processing units were randomly selected to get the desired information. The data were collected for the year 2000-01. Tabular analysis was employed. The processing units utilised about 51 per cent of their installed capacity. Maximum utilisation was in the medium units (about 59 per cent) followed by large units (about 53 per cent) and small units (about 41 per cent). The installed capacity was not fully utilised by small units because of low purchasing power and lack of credit and storage facilities. The medium units faced problems like inadequate supply of labour, credit and electricity throughout the year while large units failed to utilise full installed capacity due to inadequate supply of labour, electricity, raw materials (chilli), finance, and storage facilities and large number of processing plants. Of the total quantity of chilli processes, 77.13 per cent is recovered as chilli powder and the remaining quantity, i.e., 22.87 per cent goes waste. The difference in the size of processing unit has no influence on recovery of chilli powder. All the three categories of processing units were grinding more quantity of chilli than their break-even quantity. The profit of all the three types of units increased with the increase in the size of processing units. Employment generated in chilli processing were 3,569 hours (446 man-days) by small units, 6,583 hours (823 man-days) by medium units and 8,731 hours (1,091 man-days) by large units. Of the total employment generated, maximum employment was created in the grinding the chilli, i.e., 84.25 per cent in small units, 77.42 per cent in medium units and 60.46 per cent in large units. The employment generated by processing one quintal of chilli in small, medium and large units were 4.89 hours, 3.85 hours and 2.79 hours, respectively.

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Assessment of Energy and Cost Trends for Pulse-Processing Sector in Jabalpur, Madhya Pradesh

C.L. Thakur and V.C. Singh*

A study was conducted for four tensils of the Jabalpur district in 1998-99 in order to assess the operation-wise energy and cost requirements for traditional and modern pulse milling industries in Jabalpur district of Madhya Pradesh. Pulse milling in commercial or household practice consists mainly of two unit operations, viz., (i) loosening of husk by dry or wet method and (ii) removal of husk and splitting into two cotyledons using suitable machines.

The quantum of energy used for various activities was computed from the data of human hours required to perform the individual operation in the different pulse milling industries in terms of energy equivalent of man-hour in the process for milling gram, cowpea, arhar in the case of traditional dal mill and lentil in the modern dal mill as these pulse crops are easy to dehusk. It may be observed that maximum energy/cost was consumed for cleaning, grading and removing of husk. Arhar is difficult to dehusk pulse and thus has to undergo the husk loosening and dehusking operation 3-5 times in the process of milling. The maximum energy was consumed for gota separation.

In terms of the energy cost consumed for various operations in the traditional and modern dal mills for gram, cowpea, arhar and lentil, the specific energy/cost required for one quintal of gram, cowpea, arhar and lentil were 18.50 MJ/Rs.13.81, 16.91 MJ/Rs.12.69, 41.65 MJ/Rs.27.73 and 17.51 MJ/Rs.11.72, respectively. The total input cost/net profit per quintal were Rs.25.81/Rs.54.19, Rs.24.59/Rs.24.41, Rs. 41.51/Rs.88.49 and Rs.18.11/Rs.60.89 respectively. The energy and cost of milling required maximum for arhar milling was 41.65 MJ/Rs.41.51/qlt. The cost of milling per quintal for lentil was Rs.18.10 in modern dal mill. The net profit was the highest in case of arhar, Rs.88.50/qlt. followed by lentil (Rs.60.90/qlt.), gram (Rs.54.20/qlt.) and cowpea (Rs.24.41/qlt.), respectively.

Cassava Starch Industry in India: SWOT Analysis

T. Srinivas and M. Anantharaman†

The paper attempts an indepth study of the tapioca starch industry in India from the point of view of its strengths and weaknesses, market structure, its competitiveness and cost of production. A survey of tapioca starch production centres (Salem district in Tamil Nadu and Samalkot region of Andhra Pradesh) and marketing centres (Pune and Mumbai in Maharashtra, Kolkata in West Bengal) were undertaken to collect primary data on cost of production of tapioca starch and for identifying the channels of marketing. The

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secondary data on tapioca starch production were collected from *Indian Textile Bulletin* and *Green Book for Tapioca* for various years respectively. SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis was done for evaluating the tapioca starch industry in India. Tabular and percentage analysis were employed for estimating the cost of production of tapioca starch. The evaluation of the tapioca starch industry through SWOT analysis revealed that it has more strengths than weaknesses and has lot of opportunities to develop further overcoming the bottlenecks in future. More than half of the tapioca starch produced is being used for the production of 'Sago' for using as food. Tapioca starch faces stiff competition mainly from maize starch industry both in domestic as well as in the international markets due to its availability in larger quantities, its unique properties enabling its usage in many fields and its cheaper price. Opening our starch market in the globalised era of the world economy may pose threat to Indian starch industry owing to cheaper availability of starch internationally. The production cost of tapioca starch in Andhra Pradesh and Tamil Nadu were estimated to range between Rs. 5 to Rs. 7 per kg respectively. Consequent to the development of the industry better backward and forward linkages were established enabling the farmers and processors to reap the benefits. The future of the tapioca starch industry in India will depend on the ability to find additional outlets for its use.

Impact of Mango Processing on the Income of the Primary Producers – A Case Study

Sarada Banerjee and G.D. Banerjee*

An attempt has been made to look into the impact of mango processing on small producers in Visakhapatnam and Chittoor districts of Andhra Pradesh. These districts were purposively selected as they cover large area under mango with well-known varieties like totapuri, rosapuri, alphonso, etc. and these varieties are considered to be superior for jelly and canned pulp. Primary data on cost of investment, production, manufacturing, gross and net income were collected. Besides data on raw materials, wages, utilities, repairs, packaging losses, etc. were obtained and financing banks were discussed regarding its implementation. Although the paper has established soundness of the investments in mango processing and considerable labour absorption in jelly making in particular, the major problems confronted by the units are high cost of plant and machinery/packaging materials, seasonal availability of raw materials, weak linkage between processors and farmers, competition from synthetic products, high interest rates on capital, high taxes and duties. Therefore, concentrated efforts are required to provide enabling atmosphere for running the processing units in a cost effective way to meet the challenge in future.

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Infrastructure Development for Agro-Processing Co-operatives in Maharashtra: An Ex-Post Evaluation

Deepak Shah and K.G. Kshirsagar[†]

The present study attempts to evaluate the National Horticulture Board (NHB)'s soft loan scheme and its impact on the development of post-harvest infrastructure (PHI) for horticulture crops in Maharashtra. The focus of this study is on two processing-cum-export oriented grape growers' co-operative societies, viz., Abinav Grape Growers Co-operative Society Ltd., Agar, Pune and Vignahar Grape Growers Co-operative Society Ltd., Narayangaon, Pune. The study evaluates the performance of both the co-operatives not only on processing and export fronts but also in respect of the impact of these co-operatives on member farmers. The study shows a positive impact of the soft loan scheme towards development of PHI facilities since such facilities have not only increased the export trade of the selected societies but they have also helped in increasing the productivity levels of the crops grown in the area, besides helping in reducing the post-harvest losses of the produce. Nonetheless, with a view to further improve the efficiency of soft loan scheme, the study has made a few major suggestions, which mainly revolve around simplification of loan procedure adopted by the NHB, timely disbursement of the loan, financing of the entire comprehensive project rather than for certain specific components, subsidisation of electricity tariffs for the processing units, subsidisation of sea freight, provision of funds for setting up of Research and Development unit for marketing of the produce, provision of foreign market intelligence, etc. However, how best these suggestions are taken care of by the NHB and various other organisations will depend on their future strategies and policies relating to financing of PHI related facilities for horticultural crops.

Structure of Agro-Industries in Uttar Pradesh: Opportunities and Challenges

R.K. Singh, Govind Babu and Babu Singh*

The paper highlights the prospects of domestic demand for agricultural production in Uttar Pradesh and emphasises the necessity for growth of agro-industries in Uttar Pradesh. Uttar Pradesh is a surplus state for rice and wheat and it is considered that production diversification has to be met by substituting rice and wheat with other value added crops coupled with establishing agro-industries on a large scale. For observing competitiveness, the paper shows that the structure of the market tended to conform for competitiveness as a promising one due to new policies adopted by the state Government. The increasing number of agro-industrial units, freedom of entry to establish an agro-industrial unit, supplier access to information prices nationally and internationally have

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now become encouraging. To take advantage of the new opportunities (WTO) for growth in agri-business, there is a need for a continuous institutionalised flow of new technology. This flow should include research as well as training facilities and vocational education for the building-up in each developing country of a critical mass of skilled personnel. The paper calls for rapid all round development of infrastructure, market, electricity, water, research, etc., to compete in the world market.

Mustard Processing Industry in Bhind District of Madhya Pradesh: A Cost-Return Analysis

Shailendra Bakshi, Sunil Nahatkar and Hariom Sharma[†]

A study on economics of mustard processing was conducted in Bhind district of Madhya Pradesh. Thirty mustard processing plants were selected randomly for the purpose of collection of primary data on cost and returns through survey method. The processing plants were categorised as small, medium and large on the basis of processing chamber size and from each size group 10 plants were selected randomly. The analysed data show that in a year mustard processing plants operate, on an average, for 172 days with 18 quintals/day processing capacity. It was also observed that the capacity of the plants and total operating days of the plants were inversely related to each other, revealing that large size processing plants operate for less number of days as compared to small size processing plants due to shortage of raw material (mustard). The total cost of mustard processing was Rs. 39.46 lakhs/plant/year and among the cost items the cost of the raw material and its procurement accounts for 94.62 per cent of the total processing cost. In general all the cost items in percentage terms were identical except for labour cost irrespective of the size of the processing plants. The percentage expenditure on labour decreased with the increase in plant size revealing that large size processing plants are more efficient in terms of labour use. The net profit was also higher for large size plants as compared to small and medium size plants. But when the economic efficiency was measured in terms of cost-benefit ratio and profit over per quintal quantity processed by the plants there were no distinctive differences observed with respect to plant size and this was mainly due to high proportion of cost (about 95 per cent) of raw material and its procurement irrespective of plant size. The break-even processing quantity was much lower than the actual quantity processed by the sample processing plants revealing that the mustard processing industry of Bhind district is running in profit at the given cost and revenue structure.

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A Profile of Fruits and Vegetables Production in the North-Eastern Region and Emerging Trends and Opportunities for Post-Harvest Management

Binodini Sethi*

In the post-green revolution era even though foodgrains have been taken care of, fruits and vegetables for want of simple technologies of processing, preservation and transport to various places of need, have suffered. Post-harvest losses of these commodities estimated to be more than 25 per cent and only about 1 per cent of total fruits and vegetables produced are processed. All forms of preserved fruits are in the reach of only the urban elite and the rural masses who produce more than 90 per cent of these fruits and vegetables are usually deprived of their usage. Fruits and vegetables, which are among the perishable commodities, are important ingredients in the human dietaries. Due to their high nutritive value, they make significant nutritional contribution to human well-being. They are the cheaper and better source of the protective foods. If they can be supplied in fresh or preserved form throughout the year for human consumption, the national picture will improve greatly. Despite regional backwardness, North Eastern Region's endowment of productive factor is a strong force in favour of market access, abundant cheap labour force and also vast natural resources could be a good basis for development of export oriented manufacturing sector/processing unit in the region. Due to the presence of diversities of agro-climatic condition, north-east region has a good potential of growing tropical sub-tropical, temperate fruits and vegetables. The geo-climatic conditions of the region are favourable to large-scale production of pineapple, orange and banana. The production share of the north-eastern region in India's total production is as much as 50 per cent in pineapple, 13 per cent in oranges and 6 per cent in bananas. If special efforts are employed for their larger production, they can offer a wide scope of fruit processing units for exporting the value added items to national and international markets. Seasonal vegetables like tomatoes and cabbages are grown so plentifully that in the last stage of production, they can not fetch prices to cover even the cost of marketing and have simply to be either used as cattle feed or thrown to the garbage pits. The vegetables also offer a scope for developing processed food products that could be exported. Besides the North Eastern region which borders a few countries will also enjoy locational advantages with respect to transportation cost of export products to the neighbouring countries and hence will encourage its export capability. The export base of the north-eastern manufacturing sector lies only with respect to agriculture and allied activities and fruits and vegetables. Hence, determined efforts are necessary to raise their production above self-sufficiency level.

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Potential of Kokum Processing for Employment and Income Generation – A Case Study

V.A. Thorat, S.N. Tilekar and S.S. Bhosale[†]

Kokum (*Garcinia indica* Choisy) is one of the minor fruit crop grown in the Konkan region of Maharashtra. The area under Kokum is around 600 to 700 hectares in the region. An attempt has been made in present case study to examine the details of production, employment and income generation through kokum syrup processing. A well-known entrepreneur from a village Asud in Dapoli tahsil of Ratnagiri district was selected purposively and information on all aspects of processing of kokum syrup was collected from him with the help of specially designed schedule during the year 2002-2003. The size of land holding is 0.16 ha. only which is put under the cultivation of arecanut. The total annual income received from agriculture and other sources was Rs. 68,000, excluding returns from kokum processing. The entrepreneur is involved in the processing of other products also. The share of kokum syrup in the total value of processed products was about 83 per cent which indicates that this is the major processing activity of the entrepreneur. The total employment generated was 360 man-days for processing and 250 man-days for marketing the product indicating the potential of 610 man-days. The net income generated from kokum syrup processing activity is Rs. 44,099. This indicated that, kokum syrup processing activity generates substantial employment and income to the entrepreneur. However, there is no orderly or systematic marketing of the processed product which needs to be addressed.

An Economic Analysis of Small Scale Agro-Processing Sector of Arhar and their Future in District Kanpur Nagar, Uttar Pradesh

D.S. Singh, Narendra Kumar Gupta and Anjani Kumar Singh*

The main objectives of the study are (i) to find out the different techniques of dal milling and (ii) and how to minimise losses in different techniques of dal milling in Kanpur Nagar district of Uttar Pradesh. The four different techniques identified in this study are dal milling, IIPR dal chakki, dry dal milling, wet dal milling (commercial milling) and modern CFTRI wet dal mill. There were 50 IIPR dal chakkis, 180 dry dal mills, 100 wet dal mills and 20 modern CFTRI dal mills in the study district out of which 1 IIPR dal chakki, 2 dry mills, 1 wet dal mill and 1 modern CFTRI dal mill were selected for the study. The cropping pattern of the district revealed that arhar, wheat, maize, potato and sunflower were the main crops grown by the farmers. Out of the total cropped area arhar accounted for 19.18 per cent, potato 32.40 per cent and sunflower 26.75 per cent. The average cropping intensity in the district came to 169 per cent. Out of the losses in

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four types of dal milling IIPR dal chakki gave 10 per cent broken split and 12 per cent powder, dry dal mill gave 10-12 per cent broken split and 12-15 per cent powder, wet dal mill and DFTRI dal mills gave 0 per cent broken split and 3 per cent powder. The study indicates that the higher the recovery rate, the smaller differences in losses rate and volume between the dal and arhar from which it is determined. Commercial method of dal milling were clearly superior to large modern CFTRI dal mill, even allowing for wide range of variation in the existing capital. It may be concluded that there exists still much scope for reducing losses from the different types dal milling.

Economic Analysis of Small Scale Agro-Processing – A Case Study of Pickle Making Unit in Varanasi

Chandra Sen and Mamta Baranwal

The paper aims to analyse the economics of pickle processing unit in city Varanasi. The study revealed that out of Rs. 4.05 lakhs of investment in processing unit, 76 per cent is invested as working capital and remaining 24 per cent as fixed capital which includes investment on building, machinery, utensils, furniture, pay and allowances of unit staff and other infrastructure of permanent nature. It was found that as high as 50 per cent expenditure accounted for the raw material followed by packaging cost (18.7 per cent), tax (7.13 per cent), labour charges (3.9 per cent). Other material like fuel, interest on working capital, etc., accounted for a very meagre in working capital. The annual net return from the processing of pickles was Rs. 1.01 lakhs. The benefit-cost ratio was 1.23 which clearly indicates that 23 per cent additional return over all expenditure incurred in pickle processing.

Contract Farming as a Backward Linkage for Agro-Processing – Experiences from Punjab

P. Satish*

The paper studies the experiences of the existing contract systems with multinational companies (MNCs) as the prime movers as well as local initiatives to examine the outcome of the system. The districts of Sangrur in respect of Pepsi Foods and Amritsar in respect of Nijjer Foods, and Hoshiarpur and Patiala districts in respect of local firms were studied to analyse the contract farming arrangements. The study reveals that agreements specify buy-back arrangements of harvested crop of good quality at the agreed price, but they are one-sided and biased in favour of the companies. There is no compensation even under conditions of crop failure due to natural calamities and there is no separate independent agency for monitoring the quality of produce. Many farmers

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reported problems like poor technical assistance, delayed payments, outright cheating in dealings and manipulations of norms by firms. While the contract farming arrangements with the MNC firms with all their infirmities are still continuing though to a limited extent, the arrangements with the local firms collapsed from the second year itself and none of the sample farmers desire to continue with contract farming. Contract farming system brings to fore the problems of moral hazards and adverse selection as yield, market demand, prices and quantities in the market undergo changes in each season in a manner which is advantageous either to the producer or processor. While the State Government has been expounding on contract farming and diversification of agriculture it has not given any thought to establish a regulatory system to enforce the contracts. There is a need for institutionalising the contract farming by bringing accountability to the system so that the mutuality of benefits between the processor and the farmers is ensured.

Problems and Prospects of Fruit Processing in Andhra Pradesh

G.P. Sunandini[†]

The study focuses on the constraints of fruit processing industry in Andhra Pradesh. Andhra Pradesh ranks second in area and production of horticultural crops in India. Among these crops fruits occupy 43 per cent of area and contribute 53 per cent of production. About 30 per cent of the horticulture produce is wasted every year due to post-harvest losses, lack of appropriate storage and transportation facilities and infrastructure. Processing of fruits not only adds value to this perishable produce but in turn generates employment and improves income levels. At present, barely 1-2 per cent of this produce is processed. Andhra Pradesh has 98 units engaged in food processing. Nearly 40 per cent of these units are engaged in fruit processing especially mango pulp. Andhra Pradesh ranks first in area and production of mango and accounts for 50 per cent of the pulp exported from India. It is evident from the study that the pests and diseases, viz., stone weevil, spongy tissue, erratic and unreliable supply of quality raw materials, heavy losses due to low shelf life, handling transport and storage losses, huge price fluctuations, lack of adequate working capital and infrastructural facilities, improper crop management practices affecting the quality of pulp, high packaging costs, multiplicity of food laws and authorities, high duties and taxes are the major constraints hampering the mango pulp industry progress of the state. Andhra Pradesh produces different varieties of mango especially totapuri which is normally used for pulp extraction. Demand for processed food particularly fruit pulp and juices is constantly on the rise with increase in per capita income, increased urbanisation, fast changing lifestyles and food habits, etc. Indian mango pulp commands a premium price in the international market. Strong backward and forward linkages between the farmer and processor, required technical back-up, adequate infrastructural facilities and liberalised policy regime can make mango processing industry of Andhra Pradesh still more competitive, locally and globally.

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Growth of Fruits and Vegetables Production and Processing Industries in the Era of Liberalisation

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India is a major fruit and vegetable producing country in the world. The diverse agro-climatic condition prevailing in the country allows production of large variety of tropical, sub-tropical and temperate fruits and vegetables. An attempt is made to examine the status of fruits and vegetables sector in terms of their production and trade and to identify opportunities and challenges in The World Trade Organisation (WTO) era. The share of different fruits in the total production during 1998-99 indicate that banana, mango, other fruits and citrus altogether contribute about 88 per cent. The other fruits include papaya, watermelon, pomegranate, etc. The share of different vegetables during 1998-99 suggested that a number of local-specific vegetables contributed 49 per cent of the total production. However, because of lack of pre-cooling and cold chain and rough handling by the number of intermediaries, the loss of fruits and vegetables produce is estimated to be about 50 per cent. The process of economic liberalisation started in July, 1991 has given a boost to processing industries. At present there are 4,700 licensed fruits and vegetables processing industrial units with increased capacity. The export of fresh and processed fruits and vegetables increased with 187.13 per cent and 373.22 per cent respectively in 2000-01 over 1991-92. But, the proportionate share of fresh mangoes, onion and mango pulp in the export basket of India have substantially decreased during the same time period. The UAE is the major market for India's dried/preserve vegetables and mango pulp, whereas, U.S.A. is the emerging export market for pickles, chutney and mushroom. In the post-liberalisation era, the fruit and vegetable growers have responded positively to the policy changes. Both the internal and external demand for fresh and processed products is on the rise and is expected to grow at a much faster rate in the years to come. Still, there are numerous problems related to the technology, infrastructure and policy. The untapped potential can be realised by adopting modern production and processing technology which should be supported by congenial climate for production, processing and export through public policy support and infrastructure development.

Economic Analysis of Sugarcane Processing for Gur and Cane Juice

P.S. Rao and C.P. Singh*

An attempt has been made to find out the cost of processing of gur and cane juice and to study the extent of employment and income generation to the farmers in Kapassan tehsil of Chittor district of Rajasthan. Three villages of the tehsil and 5 sugarcane cultivators who are engaged in gur making and cane juice processing from each village have been selected randomly for the study. Secondary data were collected from published

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records of the state and central government. Total cost (fixed cost + variable cost) of processing of per quintal gur was observed to be Rs. 347 out of which Rs. 388 (93.66 per cent) and Rs. 22.00 (6.34 per cent) were incurred as variable and fixed cost respectively. It has been concluded that at the time of acute unemployment gur making process is generating employment to both animal as well as human labour and income in agriculture industry. Fuel cost and labour cost were the major cost components of processing of gur. The results show that 48.58 per cent of the returns were diverted for processing cost while 24.71 per cent goes for raw material, and the remaining 26.71 per cent returns as margin for gur makers. The value added by one rupee investment as a processing cost was Rs.1.84 while returns to per rupee investment of processed cane was Rs. 1.53. The processing cost for juice has been observed as 27.76 per cent less than gur processing. It was also concluded that value added by processing of cane for juice was very high (83.20 per cent) as compared to total returns. Processing of cane for juice is generating employment to the farmers specially in the lean season. The rate of cane juice was found to be very cheap than other cold drinks having international trade names. From the nutritive point of view also cane juice is observed to be more beneficial without any harmful effects. Hence, efforts should be made to popularising the cane juice utility among people through advertisements as well as finding out the solution for improving the shelf life quality for both gur and juice so that they can be exported in the global market. It was also found that processing of one quintal sugarcane for gur provides employment for 4.75 hours to the farmers while juice preparation through manual labour provides four times (18.75 hours) more employment than gur processing.

Food Processing Industries in the North-East India: Status and Prospects

Saundarjya Borbora and Ratul Mahanta[†]

Food processing industries can play a very important role in the economic development of India especially in the backward areas of the North-Eastern part of India. The paper tries to fulfill the following objectives: (i) to analyse the agro-horticultural resources of the region; (ii) to study the existing industries in the region, (iii) to identify the problems of food processing industries in the region and (iv) to identify the economic feasibility of food processing industries. Food processing industry has been identified as a thrust area of development specially in the North-Eastern Region of India as the region is rich in production of agro-horticultural crops. Besides food crops, there are fruit crops, vegetables and tuber crops. Most of the produce go waste during the production season due to lack of storage and processing facilities and inadequate infrastructural facilities like transport. Promotion of food processing industries will have linkage effect which will help to raise productivity also. The study indicated that the North-Eastern region is ecologically well suited for wide varieties of food produce and there is a great possibility in developing food processing industries. But inspite of large varieties of raw material available, the region has to faces a lot of challenges and constraints for setting up food

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processing industries. The region faces lot of challenges in this respect and with recent policy changes in creating an enabling environment, the near future might be bright with co-operation from the Government and the private entrepreneurs.

Fruits and Vegetable Processing Industry in Assam - An Economic Analysis of Three Tiny Fruits and Vegetable Processing Units

K.K. Barman and Namita Devi*

In this paper an attempt is made to study the present status of fruits and vegetable processing industry in Assam. The study also identifies the various impediments that retard the growth and development of fruits and vegetable processing industry in Assam. The study which is primarily based on detailed investigations of three tiny agro processing units has revealed that there is enough scope for the growth of processing units in Assam which has already attained the stage of self-sufficiency in production of most of the agricultural products including horticultural products like pineapple, orange, banana, mango, guava, papaya, jack-fruits, etc. and vegetables. Assam has earned the distinction of producing and exporting the superior quality of ginger. But unfortunately, despite the availability of raw materials and increased demand for processed foods owing to the changing lifestyle of the consumers, the agro-processing sector including fruits and vegetable processing has not made any substantial impact in generating rural income and providing employment to the youths. The study finds that lack of motivation of the small entrepreneurs, poor management, scarcity of packaging materials, high transport cost, inadequate technology, unfair competition and lack of market and product research are some of the major constraints which hinder the progress of the industry. Thus there is need to examine the constraints while formulating any policy measures for the growth of the agro-processing sector. It is the most productive sector wherein job seekers may find an alluring atmosphere to go for self-employment, entrepreneurs can visualise new horizons and the farmers can go for large scale diversification. Some of the measures like transfer of technology, product and market research, promotion and publicity and training and management are expected to make the desired progress in this sector.

Economics of Marketing and Processing of Pulses in Banda District of Bundelkhand Region (Uttar Pradesh) - A Case Study

R.B. Singh, Ram Roop Kushwaha[‡], Keshwa Prasad, Rajesh Kumar and Sant Ram[†]

The present study was conducted in Banda district of Bundelkhand region in Uttar Pradesh. The Bundelkhand region is famous for pulse production. It contributed about

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18.15 per cent of the total area and 26.72 per cent of the total production of pulses in the state. The area under pulses in the study district during the year 2001-2002 was 2.24 hectares with the production of 1.98 lakh metric tonnes. The average yield per hectare was recorded 9.2 quintals. Agro-processing industry provides crucial farm-industry linkage which helps accelerate agricultural development by creating backward linkage which helps accelerate agricultural development by creating backward linkages (supply of credit, inputs, etc.) and forward linkages (processing and marketing) adding value to farmer's produce, generating employment opportunities and increasing the farmer's net income. This, in turn, motivates the farmers for better productivity and further opens up possibilities of industrial development. The processed agro-products have large export potential also, which necessitates the expansion of agro-industries in the country.

Out of the total pulse processing units in the Banda city, three units were selected for the study. Among the pulse processing units, the highest cost of Rs. 5,18,000 was incurred on arhar processing plant followed by Rs. 4,76,000 on gram processing plant and Rs. 4,65,000 on lentil processing plant. The total cost accounts for land/building its higher share being 52 per cent, followed by machinery and equipments 40 per cent, electric fitting 4.72 per cent, and other fixed capital 3.31 per cent in arhar processing plant. Its food processing industry at present is primarily dominated by the organised sector and primary processing units. The organised sector consisting of about 18,000 factories produces over Rs. 9,000 crores of food products. Agricultural markets in India primarily being commodity market, research remains focused on the development of crops and commodities meant for direct consumption. As a result the available crop varieties are not suitable for processing, on an average, the total cost of processing comes to Rs. 4,13,914 per unit. It varied from Rs. 3,93,620 on gram processing unit to Rs. 4,29,978 on arhar processing unit. The average cost of processing per quintal including the cost of raw material worked out to Rs. 800.61. It varied from Rs. 752.05 to Rs. 831.67 per quintal showing a decreasing trend based on 50 case studies.

Emerging Trends in Fruits and Vegetables Processing in India

Brahm Prakash, D.K. Sharma and V.P. Tyagi*

An attempt has been made in this paper to study the current status of food processing industries in India with special emphasis on fruits and vegetables processing industry, to identify the constraints experienced by fruits and vegetables processing industry and to suggest policy measures for strengthening the network of this industry in India. The study revealed that primary processing adds the value of raw material by 7.6 per cent while secondary/tertiary processing contributes 25 per cent. In spite of being the second largest producer of fruits and vegetables in the world, only 1.8 per cent of the total production is commercially processed. The area and production of fruits and vegetables increased by 96.5 and 210 per cent during past two decades. But yields of these crops are quite low in comparison to yields obtained in the developed countries. Economic liberalisation

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facilitated investment of Rs. 4,977 crores in 335 new fruits and vegetable processing units during 1991-97. The number of fruit and vegetable processing industrial units and installed capacity has increased by 132 and 595 per cent during 1980-96. Low productivity coupled with inadequate production technology, non-availability of good quality raw material, poor quality of finished products, price risks involved in the production of fruits and vegetables, non-availability of refrigerated transport and cold storages and, good quality packing, poor storage of quality seeds, high post-harvest losses, high tax structure, high premium on crop insurance, absence of legal framework for contract farming, high cost of processing and packaging, costly power and frequent power breakdown are the major constraints being faced by fruits and vegetables processing industry. The prospects of this industry is bright due to changing food habits and practices, reduced dependence on domestic servants/cooks, increasing health consciousness, status promotion and the changing socio-economic scenario. Increasing productivity of fruits and vegetables through R & D efforts, availability of refrigerated trucks, construction of cold storage, proper packaging, grading, brand status, liberalising the laws and reducing tax structures, reducing post-harvest losses, promoting contract and corporate farming would be helpful in establishing more processing units.

Agro-Processing Industries in the Era of Trade Liberalisation: A Few Reflections

M.S. Kallur and K.A. Rasure[†]

The objectives of the paper are (i) to examine the structure and growth of food processing industries in India, (ii) to study the impact of new trade policy on the exports of farm products made possible by agro-processing industries and (iii) to suggest measures for promoting competitiveness among agro-processing industries. The study is based on the secondary data. The data pertaining to exports and imports for the period of 1986-1987 to 2000-2001 are made use of to know the impact of new trade policy on exports of farm products. The processing industry in India, consists of four types namely (1) Raw processed, (2) Primary processed, (3) Secondary processed and (4) Tertiary processed industries. There are over 27,500 processing units, consisting of all the four types both large and small scale in India. The estimated size of Indian food processing industry is of the order of Rs. 2,50,000 crores in the four types of processing industries. The share of agricultural exports as well as imports has come down considerably, though the fall is steeper in the case of imports. India has price competitiveness in commodities like rice, cotton, tobacco, fisheries, fruits and vegetables and the per capita availability of these commodities also has increased over time. But India has to go for more of processing of these commodities, add value and then increase exports of these agro-processed commodities. Some of the policy measures like, incentive prices, profitable technology, input and service support and abolition of sales tax for processed foods, etc.

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are to be provided. The authorities have to advise the farmers regarding the quality and different types of crops and other processed and unprocessed commodities required in the international market. The new trade policy has already given impetus for agro-processing industries and it aims at increasing the percentage of processed goods from the present 2 per cent to 10 per cent by 2010. There has to be an integrated approach in the form of exports, i.e., procurement, processing and exports of agricultural products.

Economics of Processing of Soybean in Sehore District of Madhya Pradesh

K.N.S. Banafar*

The study examines the economics of processing of soybean in Sehore district of Madhya Pradesh. Out of the total eight soybean processing units in the Sehore city three units were selected for the purpose of the study. The study reveals that the different processing units need capital investment ranging from Rs. 40.96 lakhs to Rs. 86 lakhs which may not be possible for the individual farmers but if it is done on a co-operative basis, the producer being a member and shareholder, the problem can be solved to a great extent. The share of profit may be divided according to the produce and the share of members, after giving the due deductions for maintenance and other expenses. The study is based on medium-size processing units of soybean. The total processing cost came to Rs. 98,05,387 per unit. The processing cost per quintal including the cost of raw material worked out to Rs. 1,307.40. The efficient marketing of soybean through farmers co-operatives in the rural areas on the other would go a long way in enhancing the income of soybean growers in the study area. The rural areas of Sehore district suffer from difficult terrain and lack of transport and communication facilities particularly in rainy season. Thus, there is an urgent need to develop transport and communication facilities in the study area for better marketing of the agricultural produce.

Economic Analysis of Agro-Processing Sector in Karnataka

M.B. Belavatagi and B.J. Javali†

The present study is undertaken with the following specific objectives (1) to examine the nature and extent of growth of agro-processing industries in Karnataka during 1981-97 and (2) to examine the structural changes that were brought about from time to time by the growth of agro-processing industries in the districts of Karnataka. The growth performance of these industries is measured during 1981-82 to 1996-97 in terms of various economic variables such as number of industries, employment, value added and fixed capital. The study is based on data available from the *Annual Survey of Industries* (ASI). ASI provides consistent data for specified industrial character at disaggregated

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level of three digit classification. The study shows that majority of the agro-processing industries are capital intensive in the state. Employment of more capital in these industries have partially succeeded in raising the value of output but have failed to generate employment in a majority of districts in the state. So the government has to formulate its industrial policies in such a way that these industries become labour intensive in nature.

Economics and Potential of Apple Processing Industry in Kashmir Province of Jammu and Kashmir State

F.A. Shaheen*

The study was conducted to evaluate the processing cost, economics and potential of apple processing industry in the Kashmir province of Jammu and Kashmir State. Out of two processing plants, the Apple Processing Plant, Sopore, run by Jammu and Kashmir Horticulture Produce Marketing and Processing Corporation (JKHPMC), was selected for the purpose. The other plant, owned by a private entrepreneur could not be taken for study purpose as it was installed in the same year. The study was carried out during the year 2000. The processing cost of concentrated apple juice was computed as Rs. 2,807 per quintal. More than 70 per cent of this cost was constituted by variable cost - the major portion of which goes to wages and salaries to staff and casual labourers. The cost incurred on fuel was high (28 per cent of variable cost), as the plant mostly runs on diesel because of non-availability of continued power supply. The scope lies for reduction in cost on this component, if power could be supplied to plant continuously during its processing period. The fixed costs which include the expenditure incurred on taxes, licensing fee, insurance premium, interest on working capital and depreciation on plant, constitutes about 29 per cent of the total processing cost. The potential of apple processing industry was estimated on the basis of secondary data of area and production of apples, as well as some estimates based on the data collected from the apple growers. The quantity of raw apple culls was estimated as 0.28 million tonnes (MT) with per hectare production of 3.74 MT. The income realised from these waste apples will be Rs. 2,917/ha. The total apple culls will produce 22,377.60 MT of concentrated apple juice (CAJ). Taking Rs. 53,000 per MT as price of CAJ, the total quantity of CAJ will give revenue of about Rs. 118.60 crore annually to the state. In addition to this, apple juice processing industry will make a good platform to generate considerable employment in the State. At least four processing plants of 50,000 MT processing capacity per annum can be established in the Kashmir province, where the raw material is sufficient to run them at full capacity. These facts clearly indicate that the state government as well as private entrepreneurs should come forward in this direction to exploit the potential of this industry.

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Profitability Potential of Different-Sized Rice Mills

P.P. Pawar, R.B. Hile, B.S. Kakad and D.B. Yadav[†]

Paddy is the main staple food of large majority of Indians. In Maharashtra it constitutes 30 per cent area and 40 per cent output of the *kharif* cereals. The milling process is essential to convert the paddy into rice for edible purpose. The optimum size of paddy processing unit could only be decided from comparative economic analysis of different size processing units. In view of this, an economic analysis of different sized rice mills was attempted. Igatpuri tahsil of Nashik district is a high rainfall area, where paddy occupies 14,153 hectares, accounting for 52.19 per cent of the gross cropped area, was purposively selected for economic analysis of different sized rice mills. On the basis of processing capacity 0.15, 0.75 and 1.00 metric tonnes, the rice mills were grouped into small, medium and large-sized units, respectively. The sample consists of 120 rice mills comprising 40 from each size group including huller mills, huller modernised mills and composite mills. The total investment in capital assets worked out to be Rs. 4,05,643 per rice mill of which, more than 16 per cent (Rs. 64,825) cost was on account of the value of land. The estimated break-even quantity increased with the increase in the size of rice mill which was obviously related to the installed capacity. The internal rate of return increased with time and also with capacity utilisation. The investment and quantity of paddy processed increased with the size. The variable constitutes more than half of the total cost in which electricity charges constitutes the largest share. Annual return per rice mill was Rs. 47,47,792 at the overall level with large variation among the size-groups. The break-even quantities constitutes half of the total actual quantities processed whereas the estimated profit at full capacity utilisation is higher by 56 per cent of the existing profit.

An Economic Analysis of Processing of Pulses in Durg District of Chhattisgarh

A.K. Gauraha*, R.S.L. Srivastava** and P. Mathur**

A study was conducted in Durg district of Chhattisgarh to study the economics of processing of pulses. The study is based on information collected from 10 pulse processors in the district who were processing lathyrus, blackgram, horsegram, pigeonpea, greengram and lentil at their plants. The data relating to cost of processing as well as gross and net return in pulse processing were collected for three years, i.e., from 1999-2000 to 2001-2002. The study reveals that the utilised capacity of pulse plants varies from 32 per cent in pigeonpea to 82 per cent in lathyrus. Due to decline in area under pulses the production could not keep the desired pace. The marketing cost of raw

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materials and final products consists of more than 53 per cent of the total value-added due to high transportation cost involved in the purchase of raw materials from different parts of the state and from outside the state. The per quintal processing and marketing cost was maximum in green gram (Rs. 148.00) and minimum in lathyrus (Rs. 55.50). More than 72 per cent recovery was observed in pulses. The net return and input-output ratio was higher in the case of horsegram and lower in greengram. The study suggests that the production of pulses can be increased by intensifying the use of land by cultivating short season pulses that is otherwise left fallow between the *rabi* and *kharif* crops and by introducing high-yielding varieties. This needs agricultural extension and supportive institutional network with a clear understanding of the technological parameters and constraints. Wastages of pulses could have been minimised through appropriate post-harvest measures. Government should implement policies to restrict the export of these pulses to other states and reduce the sales tax. The processors should make a necessary change, if any, in the plants to run it on those pulses only which are locally available with sufficient supply. To push up the production of these pulses, the processors may establish contract with farmers for couple of years to procure their produce. This will help in reducing uncertainty in raw material supply for processors and price risk for the farmers.

Agro-Processing Industries in Haryana: Growth in Output, Employment and Capital

K.S. Suhag, S.K. Goyal, K.K. Kundu and Vivek Bansal[†]

An attempt has been made to study the past performance in terms of production and employment creation and future prospects of agro-processing industries in Haryana State. The study is based on secondary data collected from various issues of *Statistical Abstract of Haryana* for the period 1980-81 to 2001-2002. Compound growth rates were worked out for production, employment and capital outlay of 14 major agro-processing industries in Haryana by fitting an exponential form of function. The trend analysis was done to examine the relationship between production, employment and capital to the time period. The study revealed that there is tremendous scope for agro-processing industries in Haryana State where supply of raw material, processing and marketing are not serious problems. A considerable growth has occurred in the sample agro-processing industries in terms of production, employment and capital and loans advanced. The growth rates of production, employment and capital have been found significantly positive in most of the agro-industries. Industries like khadi, leather, handmade paper, fibre, limestone, processing of cereals and pulses and carpentry and blacksmithy (C&B) industries are likely to absorb a considerable number of persons by the year 2015-16. Based on the past trends, the capital outlay in 10 out of 14 agro-industries is expected to increase by the year 2015-16. The structure of agro-industrial development underwent a significant change over time. In the present context of opening up of the economy for international competition, agro-industries need to be given special status keeping in view their employment

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potential and prevailing unemployment situation in general and that of rural unemployment in particular. Finally, it may be concluded that rural industrialisation is a viable proposition to increase employment in rural areas of the state. Further, there exists sufficient scope to increase rural employment through existing rural industries with increased use of capital resources.

Growth of Food Processing Industry in India

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The Indian food processing industry assumes great significance in terms of income, employment generation, poverty alleviation, improving agricultural productivity, reducing post-harvest losses, availability of better nutrition, export promotion and foreign exchange earnings. An attempt has been made in this paper to examine the status of food processing industry in India in terms of composition, importance of different food industries in the economy. To study the growth performance, tabular, graphical and percentage analysis has been done and annual compound growth rates have been estimated. Some structural and financial features of food processing industries have been compared with other agro and non-agro industries. It was found that the agro industry requires less fixed capital and more working capital as compared to other industries. The agro industry annually generates 5 per cent value-added over fixed capital as compared to 39 per cent in other industries. The status of investment in the different processed food sectors has been analysed. There have been positive, significant and continuous growth in the number of food processing industries and the volume of processed products during the last decade which is of great importance in the economic liberalisation period in the country and World Trade Organisation (WTO) regime. The annual compound growth rates of these sectors have shown significant growth performance during the 1990s. The performance of exports of important agricultural and processed products has shown tremendous upward growth pattern during the last decade, and there is potential for further growth in future. Due to increasing importance of food processing sector after economic liberalisation and WTO, foreign direct investment in this sector has also increased substantially. The future of food processing sector seems to be bright with growing potential for domestic as well as export markets.

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Impact of Sugarcane Processing Industry on the Income of Primary Producers in Haryana

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The main objective of the paper is to work out the comparative economics of sugarcane processing in the public/co-operative sector and private sector. The study is based on data collected from the two sugarmills, Co-operative Sugar Mill, Meham and Saraswati Sugar Mill, Yamunanagar, operating in the co-operative and private sectors respectively, pertaining to the year 1997-98. Tabular analysis was done to draw inferences. It was observed that the sugar mills played a predominant role in the development of sugarcane production in the state. A major share of the total production of sugarcane produced by the farmers in both the sugar mill areas operated under co-operative and private sectors was processed by the sugar mills. The primary producers also earned major share by marketing and processing of sugarcane through sugar mills, i.e. 76.51 and 90.22 per cent in Meham and Yamunanagar sugar mill areas respectively. Thus, the sugarmills has played a key role in the growth of sugarcane production in the state through providing remunerative prices and higher income to the farmers. The study suggests the need to establish more modern sugarmills in the state.

Role of Agro-Processing Industries as Backward Linkage in Farming Local Non-Agricultural Labour Employment, Wage Earning and Anti-Distressed Sale in Chambal Division of Madhya Pradesh

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A study was conducted in Chambal division of Madhya Pradesh with a view to examine the marketed surplus traded by agro-processing industries, disposal of processed goods, employment of local landless labour, small farmers and non-agricultural labour and to compare the wage structure of agro-processing industries with other occupations during the year 1999-2000. All the agro-processing industries in the study area engaged in mustard oilseed processing, rice and pulses processing, flour milling and dairying and dairy product processing were covered. Simple statistical tools were employed for the analysis. The different agro-processing industries including mustard oilseeds, rice, pulses, flour milling and dairy processing industries employed more than 34,000 regular and casual labour mostly landless and non-agricultural labour during the study period. Nearly the same extent of other category labour was also employed in grading, cleaning, packaging, transportation and other auxillary works. Per annum per labour employment and wage earning were much higher compared to non-agro-processing occupations prevailing in study area. As a backward linkage crucial inputs like high-yielding variety

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seeds of mustard, rice and pulses, fertilisers and irrigation purpose credit were also provided to the beneficiary small and lower medium size farms as a consequence of which such producers harvested 1.46 times higher, 1.35 times higher, 1.32 times higher yield of mustard oilseed by small, medium and large size farms compared to local producers of the same category who had not availed of such credit facilities. Agro-processing industries engaged in the field of mustard oilseed processing provided higher prices of Rs.16/quintal, Rs. 10/quintal for rice and Rs. 23 per quintal for pulses to the producers associated with such processing industries as an incentive against the other agencies involved in the purchasing of such raw materials in the open markets operated in the Chambal division of Madhya Pradesh during the study period. The main constraints of these industries were lack of capital, low margin percentage for the finished goods, lack of storage, higher production and transportation costs and indifference of state policy, etc.

Impact of Agro-Processing Plant (Milk Processing Plant, Gurdaspur) in the Post-Economic Reforms Era: A Case Study

G.S. Ghuman and J.S. Chawla[†]

The study focuses on the working of Milk Processing Plant, Gurdaspur along with its backward linkage effects on the dairy cattle, area under fodder, employment of male and female labour, production, consumption, sale and net income of the farmer producers in the rural areas of district Gurdaspur. The secondary information about the working for the plant was obtained from the office of the plant for the years 1981-82, 1990-91, 1995-96, 2000-01 and 2001-02. Primary data about different aspects were collected from 160 randomly selected farmers, 60 marginal (holding below 2.50 acres), 45 small (with holdings between 2.50-5.00 acres), 35 medium (with holdings between 5-10 acres) and 20 large farmers (with holdings above 10 acres) spread over randomly selected villages. Budgeting technique along with tabular method was intensively applied. The plant was established in 1981 with the present capacity of 66,000 litres milk against the requirement of 1.50 lakh litres over a span of 10 years from 1990-91 to 2001-02. The total staff strength at the plant (technical and non-technical) increased by 1.27 per cent over the years and the relative share of male staff went down whereas that of female staff slightly improved. The utilisation capacity of the plant increased from 55 per cent in 1990-91 to 66.22 per cent in 2001-02. The average milk handled per day increased by 35 per cent in 2001-02 over 1990-91. Consequent to the establishment of the plant average number of cattle increased from 140.70 to 158.60 per cent and the area on increased from 32.50 to 57.70 per cent on different farms, though its intensity varied from farm to farm. Production, consumption and sale of milk increased from 89.00 to 139.84 litres, 42.79 to 65.53 litres and 120.47 to 303.22 litres on different farms during 1981-82 to 2001-02. As a result the net income of the different categories of farmers increased from 347.40 to

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797.17 per cent respectively. Thus an all-round increase in the performance of the plant was observed.

Food Processing - Potential, Constraints and Requirements

Chaya Degaonkar*

Food processing industry in the modern sector is growing rapidly in the post-1980s in many developing countries including India. It is now in the process of diversification and internationalisation on account of two main factors, viz., changing consumption patterns initiated by cultural globalisation and technical progress. In the post-globalisation period, the industry has assumed more significance on account of substantial export potential. But the industry is yet to prepare itself for this. The paper (focusing on horticulture and floriculture products) attempts to examine the potential, identify the constraints, explore the alternative models and find possible solutions. The vast potential for development of this industry is evident from the growing urban market in the country contributing to the entry of multinational companies in processed food products and soft drinks. The exports of agriculture and allied products are increasing over time period. The area under horticulture and floriculture is also increasing. The constraints in building up a viable processing sector may be identified as input supply, technology, infrastructure, knowledge and information, marketing and finance. There is a need to provide adequate infrastructure and technology support to rebuild the industry. The co-operative as well as the self-help group micro-enterprise model is suggested here to build up the industry in decentralised sector. Though, developing the industry along these lines is likely to pose many challenges yet, this seems to be the only desirable alternative to balance between the global capital and local interests. The public sector has to play an important role in the provision of infrastructure and development of research and extension network. Strong co-operation from NGOs is equally essential.

Economics of Processing of Gram and Emerging Problems: A Case Study

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The objectives of this paper are to study the existing market structure and the processing of gram and problems thereof. Narsinghpur district in Madhya Pradesh was selected as the crop formed the largest percentage of gross cropped area of the district. Narsinghpur Krishi Upaj Mandi was selected for collecting secondary data. The study is based on data collected from five villages and from each village 10 farmers were selected using random sampling technique. The study pertains to the year 2001-02.

Gram is sold as unshelled gram. In the *dal* mills it is shelled, dried and stored for deferred sale when the prices increase with the shrinking supply. Analysis of arrivals data in mandi during last 10 years indicated that farmers sold the marketable surplus

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during the harvest season and minimum quantity was retained till the pre harvest season. The farmer's level data also showed that three-fourths of the total marketed surplus was sold in the harvest and post harvest seasons. It was estimated that in one quintal of gram processed, 75 kg. of fine *dal* was obtained. The damaged *dal* weighed about 2 kg. Among the by-products, bran weighed 12 kg. shell, 8 kg. And small prices, 3 kg. On applying the price per quintal of these products at the time of investigation, an estimate of value of different products was obtained in a quintal of gram. The value so obtained was Rs. 1,750. With the purchase price of gram by the mill being Rs. 1,400, the gross profit came to Rs. 350 or 25 per cent over and above the purchase price. It may be said that the real beneficiary of marketing and processing of gram was the *dal* mill owner who purchased gram at the lowest price of the season, processed the gram and got the value of every small product and by product. He deferred the sale of products and by products to the lean season and got the highest price. The farmers, on the other hand, got no benefit of marketing and processing. With the high level of production and increasing marketed surplus the processors intended to run the mills for the maximum period of the day. However, they faced with the problem of supply of electricity. It was neither adequate nor regular. The only way to benefit the small and big farmers is to set up *dal* mills in the co-operative sector by the farmers co-operatives.

Emerging Problems of Soybean Processing in Indore District of Madhya Pradesh

S.K. Gupta and A.M. Mishra*

An attempt has been made in this paper to examine the problems of soybean processing in Indore district of Madhya Pradesh. For this study, Indore mandi was selected from Indore district. Five villages each were selected from the jurisdiction of the mandi and from each village 10 farmers were selected randomly. Thus, the total sample of 50 farmers were selected randomly from five villages and the study pertained to the year 1999-2000. During last 10 years about 30 lakh quintals of soybean arrived in Indore mandi. The farmers sold most of the produce during harvest season. The prices were lowest during this season. The average annual minimum price of soybean was Rs. 301 per quintal in 1981-82, Rs. 638 per quintal in 1990-91 and Rs. 950 per quintal in 1999-2000. Soybean was entirely processed in the oil mills. The farmers sold soybean to different agencies who in turn sold it to oil mills for processing. The price per quintal of oil was Rs.3,200 and that of oil cake was Rs. 750. The processors faced the problem of supply of electricity. Due to increasing production of soybean there was mounting pressure on the channels of marketing and markets themselves. However, due to entry of OILFED, the farmers have been benefitted by higher minimum prices. The real beneficiary, however, was the processor who benefitted not only from oil which was a precious commodity but also the deoiled cake which brought in foreign exchange. The farmers were deprived of the benefits of exports.

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Processed and Non-Processed Fish Exports: Trends, Status and Prospects of India in World Fish Trade

Pradeep K. Katiha, Chinmoy Chakraborty and Indradeep Chakraborty[†]

The composition of processed and non-processed fish in India and world exports are studied to assess their potential in future world fish trade and export enhancements. The main objectives of the study are to evaluate Indian and global exports in terms of overall trends; trends in composition of processed and non-processed fish; and position and prospects of India in world fish exports. The secondary data on annual exports for different fish commodities have been collected for India and the world from Food and Agricultural Organization (FAO) Yearbooks on Fishery Statistics. Simpler tabular and growth analysis has been done to obtain the results. Time series data for the period 1977-2000 has been used for composition of fish exports on a triennium basis to overcome the problem of wide fluctuations in their value and quantity. The composition of fish exports in terms of quantity and value followed a rising trend for both India and the world. But, for India, a comparatively higher growth rate of 10.08 per cent in quantity and 8.68 per cent in value was observed as compared to the world at 4.91 and 8.21 per cent respectively. The share of processed fish products was insignificant. The exports of most of the processed and non-processed commodities had increased, but due to very high fluctuations over the years the growth rate was significant only for crustaceans and molluscs and overall exports. The share of Indian exports in global fish trade was 1.8 per cent in quantity and 2.28 per cent in value. The most important was India's contribution in world shrimp export at over 6 per cent. The study indicated that with World Trade Organisation (WTO) agreements the conditions are very favourable for Indian exports, as the most demanded/exported commodities had very high share in Indian exports. The need of the hour is efforts to enhance the processing and value addition activities. Finally, some recommendations are made to boost Indian fish exports both in processed and non-processed form.

Role of Agro-Processing Co-operatives in the Rural Economy - A Case Study

R.D. Khodaskar*

The study traces the working and performance of Rajapur Co-operative Phal Prakriya Kharedi-Vikri Sanstha Ltd., Kodavali, Rajapur, district Ratnagiri. This unit was registered in 1985-1986 with a membership of 37 mango growers from villages around Rajapur. A total of fifteen mango growers were selected randomly from Rajapur and Harnai villages in Ratnagiri district and in-depth information was collected considering them as case studies during the year 2002-2003. It is observed from the data that on an average area per farm under mango crop of the sample growers was 1.30 ha. The average

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mango production per farm was 2.92 tonnes (2.2 tonnes/hectare). The sample growers produced three varieties, viz., Alphonso, Kesar and Ratna. More than half of the produce was sold through co-operatives which indicates the important role played by co-operatives in marketing of mangoes, both fresh fruit and in processed form. Raw materials were the most important cost component and they accounted for 86.22 per cent of total cost. The unit also incurred some amount of cost as electricity cost, rent, interest payment, depreciation and maintenance of machines. The total sale proceeds of the unit stood at Rs. 8.15 lakhs for the year 2002-2003. The recent developments in the post-harvest have contributed significantly in improving the total quantity and quality of mangoes from Ratnagiri district. Besides the co-operative societies are giving attention to post-harvest management and a need is suggested to develop the pre-harvest management also.

Recent Trends in Export of Agro-Processed Products and Changes in Pre- and Post-Liberalisation Period

Amit Kar[†]

An attempt is made in the paper to analyse the trends in export earnings from various agro-processed commodities in the pre- and post-liberalisation periods. It was observed that during liberalisation period the export earnings were maximum from marine products (21 per cent), followed by rice (15 per cent) and the contribution of processed fruits was 4.4 per cent. The most important commodity exported during pre-liberalisation period was tea (18 per cent). The processed fruits, juices increased in total export percentage during liberalisation period. Earnings from cotton export decreased during liberalisation period as compared to pre-liberalisation period. But the growth in export earnings of various commodities was quite different than their extent of contribution. There was decline in export earnings from few commodities partly due to distorted domestic prices for products like rice, wheat, oil meals, tea, coffee etc. To exploit the full potential of Indian agri-exports under the sanitary and phytosanitary conditions, inferior export infrastructure specific to agri-products, such as storage, port handling facilities, lack of large scale processing technology and export quota restrictions should be improved.

Impact of Milk Processing on Small Farms: A Case Study

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The livestock and livestock based processing have immense potential for creation of employment in rural India. The present study was conducted to find out the impact of

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milk processing on income and employment on small farms of Damoh district, Madhya Pradesh and to examine the problems faced by the small milk processing farms and suggest measures thereon. Twenty small milk processing farms mainly producing *deshi ghee* and 20 non-milk processing farms were selected. The study concludes that the processing of milk definitely increased income and employment of the small milk processing units as compared to non-milk processing units who sold directly to other vendors. The major problems faced by the processing farms are unavailability of good quality of milch animals, inefficient management of feeding and breeding of animals, lack of proper organised market system (farmers did not receive remunerative prices every time), lack of storage facilities, technical and infrastructure support system and packaging facilities. To overcome these problems the study suggests that since the processing units are looked after by household workers, good training programmes for managing these units be developed for manufacturing low cost packaging material and dairy feed formulations at the village level. The collection centres must be established on co-operative basis. Sufficient financial assistance by the government credit agencies at cheaper rates of interest must be provided to encourage the small producers and infrastructure facilities and extension activities must be developed.

Economics of Processing of Tapioca in Salem District of Tamil Nadu

S.D. Vaishnavi, P. Raghu Ram, M.S.M. Raju and T.V.N. Sastry[†]

An attempt has been made in the paper to study and examine the various aspects of processing tapioca in Salem district of Tamil Nadu. In Salem tapioca is largely grown as an irrigated crop and more than 750 tapioca-based processing units are concentrated in the district offering assured market. The study pertained to the year 1999-2000. It was observed that of the total investment, the major item of investment was on machinery on which the amount spent was Rs. 9,35,000 by starch units, Rs. 14,38,000 by nylon sago units and Rs. 13,79,000 by roasted sago units. The cost incurred to process one quintal of tapioca raw tubers was Rs. 288 for starch units, Rs. 393 for nylon sago units and Rs. 333 for roasted sago units. The cost of processing per quintal of starch amounted to Rs. 882, for nylon sago Rs. 1,400 and roasted sago Rs. 1,172. The value of by-products amounted to Rs. 5,97,500, Rs. 7,76,937 and Rs. 7,64,420 for starch, nylon sago and roasted sago units respectively. The net returns were found to be highest in roasted sago units followed by starch units and nylon sago units. The returns per quintal of tapioca processed into nylon sago units amounted to Rs. 406 and for roasted sago Rs. 359 and Rs.308 for starch units. The existence of processing units in the study area ensured an assured market for tapioca growers. The study suggests the need to develop storage technology for the storage of tubers to overcome any time lag between the days of arrival and processing.

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Growth, Structure and Prospects of Agro-Processing Industries in India: Is there Improvement since the Economic Reforms?

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Agro-processing industries have a prominent place in the manufacturing sector in India. They make a significant contribution directly as well as indirectly by stimulating development in the agriculture and rural sectors. This study has examined the growth, structure and prospects of agro-processing industries in the recent years and the impact of economic reforms on the growth and prospects of agro-processing industries. It uses data from the *Annual Survey of Industries* from 1980-81 to 1997-98. The results showed that agro-processing industries have high employment intensities and therefore are contributing substantially to employment. There has been a substantial increase in employment in man-day employees over the reform period, whereas this has actually declined in the non-agro industries. These industries also have high raw material and working capital intensities. The raw material intensity stood at 90 per cent indicating substantial linkage with the agriculture sector which produces the raw materials. The working capital intensity for the agro-processing industries was around 37 per cent as against 24 per cent for non-agro industries. This indicated that agro-processing industries are highly dependent on raw material supplies from agriculture, and that working capital requirement is greater and crucial for agro-processing industries. The labour efficiency has improved over the reform period in all the agro-processing industries. But capital use in agro-processing industries seem to have increased leading to lower output-capital ratios as compared to earlier. The regression analysis of the growth and determinants of agro-processing industries indicates that per capita income is a major determinant of growth. Agricultural production indicating the dependence on agriculture for raw material supplies also emerges as an important determinant of growth. Non-foodgrain agricultural production is found to be particularly important. Further, economic reforms initiated since the early 1990s have had a positive effect and have enhanced and accelerated the growth of agro-processing industries.

Income and Employment Generation Potential of Fruit Processing Industries in Tamil Nadu

P. Nasurudeen and N. Mahesh†

The paper highlights the income and employment generation potential of fruit processing industries in Tamil Nadu. The economic viability and financial feasibility of the processing units were evaluated in order to understand the present state of affairs of these industries. Out of the total 385 fruit processing units in Tamil Nadu, 80 per cent of

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the units were under the category of small industries with an average capacity of 5.5 tonnes/day and the wage component of these industries was Rs. 5.75 lakhs to employ 11,057 man-days of labour. The net returns from such type of units was about Rs. 36.8 lakhs. The remaining units were under medium scale category with an average capacity of 80 tonnes per day and the employment generation was 33 lakh man-days in this category. The net income was Rs. 43 lakhs per unit. The employment generation was 45.55 lakh man-days with an income generation of Rs. 14,365 lakhs. The capital productivity measures indicated that benefit-cost ratio was higher in small-scale industries than in medium scale units and the Internal Rate of Return was 22.75 per cent and 24.51 per cent for medium and small-scale units respectively. The capital-output ratio was higher in small-scale units (1.042) as compared to medium scale units (0.568). The capital-employment ratio was more than double in the medium scale units than that of small-scale units. It was only 339.15 for small-scale units and 833.33 for medium scale units. With the increasing demand for processed foods and changes in food habits, there is a better scope for establishing processing units by diversification of processed products.

Economic Performance of Food Processing Industries in Karnataka

S. Lakshmikanthamma*

The paper seeks to analyse the performance of food processing industry in Karnataka, with particular reference to variables like investment, production, employment and income generation etc. during the pre- (1980-90) and post- (1991-2000) New Economic Policy (NEP) periods. The study is based on secondary sources of data collected from various published and unpublished sources. The analysis indicate that the performance of food processing industries in the state is positive in post-NEP period with respect to selected variables like capital investment, employment and income generation, profit earnings, etc. Thus, NEP of 1991 has a positive impact on the food processing industries in the state.

Agro-based Oil Processing Industries in Raipur District of Chhattisgarh: Strengths and Weaknesses

V.K. Choudhary and N.R. Lalwani†

Looking to the importance of agro-based oil industries the present investigation has been carried out to assess the strengths and weaknesses of agro-based oil industries, to estimate cost and return of different oils, to estimate benefit-cost ratio of oils and to suggest policy implications for the development of agro-based oil industries. The study

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has been carried out in Raipur district of Chhattisgarh State. Three oil industries of different plant capacity has been surveyed for the collection of data. Secondary data has been collected from District Industrial Centre (DIC). Primary data has been collected through personnel interview from the owner and staff of industries. These industries were situated under the Chhattisgarh Industrial Developmental Corporation (CIDC). Information pertaining to raw material cost and availability, processing cost, input output ratio, returns, variable cost, fixed cost, marketing, problems and suggestions have been taken. The data have been collected for the financial year 2002-03. The study revealed that there are more than 250 rice mills in the district. They process paddy and produce rice and rice bran as by-product. This by-product is being used by the agro-based oil industries as raw material. The peak period of processing of rice bran is from October to March. In the off season (April to September) other oils like sal seed oil and mahua seed oil are processed. These raw material are available in different districts of the State particularly Bastar and Surguja districts. The study has brought out that the existence of the oil processing units in Chhattisgarh depend upon the availability of raw material and its prices. The need is emphasised to cultivate other oilseed crops in the possible cultivable area of the region or to encourage diversified farming to help the farmer obtain a better price and supply of raw material through different marketing channels to agro-processing industries. At present out of the 14 agro-based industries of Raipur only 3 industries are functioning. Therefore attention should be drawn on these sick industries and Government should come forward to facilitate these industries. New oilseeds should be identified to run these industries during off-season and the regulations need to be made easier to uplift the sick agro-based units.

Economic Analysis of Public and Private Sector Seed Processing Plants in Haryana

K.N. Rai and O.P. Chhikara*

Quality seed production is a specialised activity and a portion of crop produce retained by the farmers, as seed, cannot be a substitute for quality seed as it generally lacks genetic vigour and has poor germination. The Seed Act came into force in 1968. In 1976, the National Seed Project (NSP) was launched and seed production was decentralised. State Seed Corporations were set up under the NSP in the states for the multiplication and distribution of quality seeds. A large number of private firms are also producing and marketing the certified seeds of different crops in the state. The development of seed processing plants is determined by the costs and returns from seed processing. Therefore, the present study on costs and returns of seed processing will present a clear picture about the nature and performance of seed processing plants. The profitability of processing plants of both the public and private sectors was studied for the paddy, cotton, wheat and mustard crops, as these were the main crops. Yamuna Nagar one of the major paddy growing districts and Hisar and Kurukshetra being one of the

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major cotton and wheat growing districts, respectively having state and private seed processing plants were selected purposively for the present study. Both public and private sector processing plants in operation in these districts were selected for the present study. The data pertained to the year 1998-99. The study concludes that seed processing of paddy, cotton, mustard and wheat was a profitable proposition. Therefore, there is a scope for persuading a large number of entrepreneurs to take up seed processing activity keeping in view the existing replacement rate of quality seed which is much lower than the expected one. The share of variable cost in total per quintal processing cost of seed incurred by the public and private sector plants ranged from 81 to 95 per cent. All the three public sector and two private sector plants were operating on profit. However, public sector plants were earning more profit as compared to private sector plants on account of subsidy element and economies of scale in the public sector seed trade.

An Economic Analysis of Agro-Based Industries in Haryana

S.P. Singh and R.K. Grover[†]

In this paper an attempt is made to examine the profitability of agro-processing industries, especially the cotton, rapeseed and mustard and dal mills in Haryana. Based on data collected from major processing areas of the selected crops, it was found that the processor earn good profit margins in all processing units. The profit margins earned per quintal in cotton ginning were Rs. 212.90 (10.59 per cent of cotton price) in cotton. The oil mill owners earned a profit margin of Rs. 108.59 (5.03 per cent of rapeseed and mustard price) in rapeseed and mustard. The dal mill owners earned a profit margin of Rs. 36.52 per quintal (2.44 per cent of the raw margin price) in gram. Thus the level of profit margins yielded good returns to the owners of processing units on per annum basis and as such agro-processing of cotton, rapeseed and mustard and pulses is a remunerative business entity for the entrepreneurs in the state. It was observed that the processing cost depends on the capacity utilisation of the processing unit. The agro-processing units can further increase their returns by increasing the quantity processed by them.

How to Strike Successful Backward Linkages with Primary Producers? Lessons form Gherkin Experiment

T. Ramesh and C.P. Gracy*

The paper is based on a study conducted in Tamil Nadu during 1997-98 in order to examine the existing linkages between the farmers and processors in the promotion of gherkin crop. The services provided by the processors and the performance of farmers under a changed environment are critically analysed. For the purpose a sample of 30

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