Enabling Development in Bihar

Agenda for Action

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List of Abbreviations

ANSISS	AN Sinha Institute of Social Studies
BIA	Bihar Industries Association
COMPFED	Bihar State Co-Operative Milk Producers Federation Ltd
CDS	Current Daily Status
CACP	Commission for Agricultural Costs and Prices
CAGR	Compound Annual Growth Rate
DFID	Department for International Development
FAO	Food and Agriculture Organisation
FES	Friedrich Ebert Stiftung
f.o.b	Free on Board
GDP	Gross Domestic Product
GoI	Government of India
GoB	Government of Bihar
Hec	Hectares
ICT	Information and Communication Technology
IDDP	Integrated Dairy Development Programme
IEG	Institute of Economic Growth
IFPRI	International Food Policy Research Institute
IFCN	International Farm Comparison Network
ITC	Indian Tobacco Company
Kg	Kilogram
Kms	Kilometeres
LLPD	Lakh Litres Per Day
LPD	Litres Per Day
MSP	Minimum Support Price
MT	Metric Tonne
NCAP	National Centre for Agriculture Economics and Policy Research
NGO	Non Government Organisation
NSSO	National Sample Survey Organisation

OF	Operation Flood
PDS	Public Distribution System
PPP	Public Private Partnership
Qtl	Quintal
R&D	Research & Development
SAP	State Advise Price
SDF	Sugar Development Fund
SME	Small and Medium Enterprise
SWOT	Strengths, Weakness, Opportunities , Threats
TCD	Tonnes Crushed a Day
TLPD	Tonne Litres Per Day
UNIDO	United Nations Industrial Development Organisation
UNDP	United Nations Development Programme
USA	United States of America
VAT	Value Added Tax

EXECUTIVE SUMMARY

The Context

The need to design and implement programmes that would put the economy of Bihar into a high growth path has never been felt so strongly before. With the pronouncements by the state government that all efforts will be made to bring measurable changes across the broad spectrum of development issues and that governance will be a strong pillar of the new growth and development strategy, hopes are soaring. There is a sense of urgency among all stakeholders to enable change, though guarded in certain ways, lest the alternative path boomerangs. Within this larger context, the various development partners have been making incessant efforts to carve out the desired strategy

Deshkal - FES Initiative

Extending the same line of thinking, Deshkal in collaboration with the India country Office of Fredrich Ebert Stiftung (a German development partner) initiated a process of dialogue during January-February 2006. During a 2-day consultation held in Patna on Feb. 22-23, 2006, the partners sought to evolve a consensus on identifying the sectors that are promising and have the potential to address issues of employment and growth with varying doses of policy and programme interventions based on good governance and social clause.

The discussions indicated the need to build upon the comparative advantages of the state and complementarities between public and private investments in the 'leading sectors'.

What needs to be done?

Three key agro-based sectors/sub-sectors that emerged as the "potential sectors" are (i) Dairy (ii) Sugarcane & (iii) Fruits processing & Vegetables – with regional concentration of fruits such as Litchi (in and around Muzaffarpur) and Makhana (in and around Darbhanga).

Dairy

Dairying is seen as a low-cost effective tool for rural transformation in Bihar, on account of the fact that it requires comparatively low levels of investment (in the order of Rs. 25,000-30,000), minimal gestation period, limited skilled/specialised training. Further, there is a consensus that promoting dairying will strengthen its symbiotic relationship with agriculture. While these are some of the rationale for promoting the dairy industry from the supply side, there is a strong demand-supply gap as far as the production and consumption of milk is concerned.

Value addition requires investments, for which the industry groups such as the Bihar Industries Association (BIA) has indicated the likelihood of the investors to be a part of this initiative. The government on its part is expected to create enabling environments in terms of improving transport and power infrastructure, credit facilities and attracting more professionals to join the initiative to help expand the product mix. A well-defined labour policy and a conducive climate for adherence to product, packaging and environmental standards is likely to ensure better returns to all stakeholders along the supply chain and also a definite expansion in the product mix.

Sugarcane

With 227,000 ha of area under sugarcane cultivation, the discussions clearly articulated the areas for intervention, along with identification of investment opportunities and the desired forms of incentive structures. Some of these indicative areas are: capacity expansion, diversification into the manufacture of ethanol and molasses based alcohol, gur production etc. The requirements of magnitude of investments would however vary across these areas, which would call for more of public-private partnerships (PPPs). The identification of specific geographical clusters spread across 14 districts can be seen as a step in the right direction – as most of these districts are the ones that are currently experiencing high rates of out-migration. A growth momentum through a strengthened value chain coming from the sugar belt in Bihar will be a major step in reducing the vulnerabilities of many families of the region.

Fruits & Vegetables

Given the fact that fruits and vegetables are grown in more than 33 lakh hectares in the state (27 lakh ha for fruits and the rest for vegetables) and that nearly 10 million MT of fruits and vegetables are produced annually in Bihar, promotion of these two sectors have a strong potential to add to both income and employment to large

numbers of farmers. Adequate processing and storage facilities that help in increasing the shelf lives of the fruits and vegetables would help in getting better returns even for the marginal and small farmers, who normally take vegetable cultivation as a distress - led diversification strategy of making the most of their small pieces of land. The challenge lies in creating adequate incentives in terms of infrastructure, storage and marketing facilities to bring in remunerative returns.

The urgency to tap the inherent potential in litchi processing is also important to take care of seasonal gluts, storage problems, and retention of nutritive value of the fruit, apart from addressing the issue of expanding employment and income opportunities. An emphatic shift to litchi processing is expected to enhance revenue earnings all along the value chain.

To support this, there is a need to promote establishment of community canning/packaging centres, marketing yards and cool chain transport systems. With the establishment of Litchi Research Centre, it is envisaged that better research and training would be possible to be integrated with the specific industry needs for processing.

Makhana is another strong leading sub-sector that can help rural transformation, though in limited pockets of Bihar. Spread over nearly 7 districts in north and north-eastern parts of the state, the industrial organisation is multi-tiered that strengthens both the - backward linkages, product development and strategic marketing. For each of these tiers, significant opportunities exist.

The Road Ahead

It is evident that an agenda for action that is based on some of the identified leading sectors (as outlined above) has a strong potential for engineering a process of fast pace growth and employment in Bihar. This report is a compilation of the discussions held during the Consultations held in February 2006. While detailing on the rationale, overview of the three identified sectors/sub-sectors, the report seeks to draw the attention of all the stakeholders to the need for seeing the development action agenda through a value chain lens - something which was strongly felt during the consultation. This, *inter alia*, has led to sketching the possibilities of intervention in the three “potential” sectors.

Finally, it also emerged that applications of principles of good governance with the objective of promoting growth and equity will be the single most critical success factor to catapult the state into a new growth environment.

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1 THE PREVAILING CONDITIONS

1.1 THE MACRO CONTEXT

The recent past has been witness to numerous efforts aimed at enabling the economy of Bihar to move from a state of inertia of rest to one that allows the state's economy to move on to a high growth and fast development trajectory. These efforts have been a result of singular and/or joint efforts at various junctures initiated by multiple stakeholders, including the state and central governments, Planning Commission, development partners, practitioners, industry groups, labour associations, academia and the civil society. There has been a common theme that underlines or binds all these efforts i.e the search for some sort of a panacea to cure some of the fundamental problems of employment and low-income growth pattern across sectors. This search has been further necessitated by the need for identifying an appropriate vector of urgent programme-based interventions at the ground level that simultaneously address the issues of social inclusion.

While the genesis of the current state of the economy of Bihar is broadly traced to a narrow industrial base, poor delivery of social services, and both constrained by relative inefficiency of public administration and poor governance, there are certain indicators and facts that need to be recognised before developing any framework for policy and programme perspective. These can be seen in terms of some of the following:

1. Majority of workforce is concentrated in the agriculture sector and therefore, any intervention will have to address this sector to create the necessary "primary" and "ripple" effects in the economy;
2. Agriculture sector is the largest contributor to the Gross State Domestic Product, and efforts to place the economy on fast output and employment growth track will have to be agro-based ;&
3. Resilience of the industrial sector, as reflected in the high growth registered (10 per cent during mid-90s), even while agriculture witnessed negative growth during the same period.

1.2 DESHKAL - FES INITIATIVE

Extending the same line of thinking, Deshkal in collaboration with the India country Office of Friedrich Ebert Stiftung (a German development partner) initiated a process of dialogue during January-February 2006. To the extent that the dialogue was also aimed at finding or locating some points of intervention within the overall political and economic scenario of the state, there is indeed an organic link between the earlier efforts and the current one initiated by Deshkal and FES. While this is a definite indicator of a continuous and evolving process of social dialogue, there is a different dimension that has been attempted in the current dialogue and efforts initiated by these two organisations. The real point of disjuncture and an encouraging one too, comes from the fact that during the 2-day consultation held in Patna on Feb. 22-23, 2006, the partners sought to evolve a consensus on identifying the sectors that are promising and have the potential to address issues of employment and growth with varying doses of policy and programme interventions based on good governance and social clause.

Journey traversed so far……

From what began as an exploratory exercise for identifying the opportunities and enablers for industrial development in the state, finally resulted in a consensus that pinned its hope on agro-based led agenda for action for the overall development.

While the entire exploratory exercise may seem out of sync with the present juncture at the first instance, the process of consultation and the various dimensions that were discussed debated and agreed upon shed adequate light on the inherent linkages between the objectives and the resultant output.

The initial exercise in February 2006 began with the idea of coming out with an output in the form a concrete Action Plan that may be presented to the potential stakeholders, including Government of Bihar (GoB), donors (bilateral and multilateral), development partners, policy makers, researchers (for further enquiry) and practitioners for making a head start at the ground level. This was based upon the following:

- Developing an understanding of the current thinking of GoB on the issue of industrial development in the state;

- Understanding the broad contours of the warranted steps that the GoB is currently envisaging on this aspect; &
- Locating the links (explicit and/or implicit) between (industrial) investments, governance (including issues of labour standards.

The consultation brought together a number of domain experts and practitioners from various sectors, including the representatives of industry and labour associations and NGOs. The discussions spread over 6 technical sessions indicated the need to build upon the comparative advantages of the state and complementarities between public and private investments in the 'leading sectors'. The discussions also attempted at developing a better understanding of the mechanisms for ensuring 'decent work' in these sectors. Interestingly, this consultative process has also helped in understanding desired enabling interventions in terms of governance and social clause parameters.

1.3 EMERGING AGENDA FOR ACTION

With a contribution of 38.5 per cent to the state GDP and the nearly three-fourths of the workforce currently engaged within the agriculture sector, an agenda for action for enabling development in the state has to naturally locate itself within the agriculture sector. However, the state has witnessed slow growth of this sector as it continued having poor crop yields and has only 60-70 operational food processing units/agro industries which is very low as compared to other states. Among the reasons for poor performance of the sector, the key ones are:

- Inefficient water management;
- Small and fragmented land holdings;
- Poor infrastructure and natural vagaries;&
- Labour market constraints and weak capital market

These reasons have also constrained the development of industrial sector as a result of which the state possesses a very narrow industrial base. Additionally, the state witnesses insignificant levels of people's participation in development planning and poor outreach of service deliveries to vulnerable groups.

Based on the above process of consultation, the present report presents a select list of action points that are warranted at present to push the state's economy into a "fast growth trajectory".

The consultation, in conformity with the previous attempts by agencies such as the World Bank particularly, clearly identified that the process of enabling development in Bihar would be a function of the growth inputs and triggers in the agro-based sectors. While the report recognises the significance of the earlier efforts to identify the broad sectors for promoting development in Bihar, it also quite importantly builds on these and enables the various stakeholders move ahead along the continuum.

Three key agro-based sectors/sub-sectors that emerged as the "potential sectors" are (i) Dairy (ii) Sugarcane & (iii) Fruit & Vegetables processing – with regional concentration of fruits such as Litchi (in and around Muzaffarpur) and Makhana (in and around Darbhanga).

Based upon the data and information shared during this consultation and other available information in the public domain, the report maps the rationale for focusing on each of these sectors, the initiatives (both public and private) that have been taken in the recent past, followed by the observed constraints and desired inputs to overcome these constraints along the supply chain. It is important to mention at the outset that the agenda for action so derived, calls for policy and programme based interventions from the government as well as entrepreneurial initiative from the private sector. Further, the suggested infrastructure related investments are, therefore, in the context of the potential and warranted inputs for each of the potential sectors.

At this juncture, Deshkal would like to reiterate that the World Bank Report (June 2005) had clearly indicated that within the existing scenario, there is hope for putting the Bihar's economy on a fast growth path. It had also indicated the broad sectors and policy prescriptions with an emphasis on governance for development. The present exercise is an addition to this initiative and suggests the need to focus on three specific agro-based sectors, namely dairy, sugar, and fruit processing & vegetables. It is evident from the present analysis that a comprehensive understanding of the supply chain in each of these specific sectors, coupled with a disaggregated picture of the value chain helps in showing the strengths (S), needs (N) and alterables (A) for each of these sectors. While the SNA framework may appear as a technical framework developed by management gurus, it does draw upon the macro objectives of growth and equity and at the same time underscores the need to adopt a more business-like approach in implementing these action points. In fact, in the governance framework, it

is this “business-like approach” that is projected as a critical factor for effectiveness in terms of achievement of stated objectives and efficiency in terms of economic costs.

The report is thus divided into 5 sections, including this section on the macro context, followed by

- Section 2 on Dairying- A Strong Employment Potential
- Section 3 on Sugarcane – Many Reasons to go Ahead
- Section 4 on Fruits Processing and Vegetables – Betting on the Strong
- Section 5 which is the concluding section and spells out the agenda for action. Basis this an action plan can be formulated.

2 DAIRYING- A STRONG EMPLOYMENT POTENTIAL

2.1 EMPLOYMENT POTENTIAL OF THE DAIRY SECTOR

As has been mentioned earlier, dairy as a potential sector qualifies for rooting the development agenda within the larger framework of the economy of Bihar and more specifically by the dominance of the agrarian sector in the state. The discussions during the Consultation clearly emphasised that with minimum investments at the lower end of the production and supply chain, the dairy sector has the potential of absorbing considerable proportion of the workforce within agriculture into gainful economic activity. Moreover, it is felt that this is probably the sector that would help large number of those at the lower end of the supply chain to move from a state of dependency on agriculture to economic empowerment through assured incomes through participation in the value chain. Basing the development interventions on the dairy sector would also signal an affirmative process of enabling social inclusion of vulnerable groups (including women) as well as a sincere effort towards inclusivity in planning the development agenda.

The importance of the livestock sector can be seen from a few select indicators given below[1]:

- The contribution of the livestock sector to total national gross domestic product (GDP) was 5.9 per cent in 2000-01, with the milk group making the highest contribution to the total value of the agriculture and allied sector (Rs. 1,44,088 crores).
- An estimated 20 million people are employed in the livestock sector in principal (11 million) and subsidiary (9 million) status (GoI, 2003).
- Women constitute about 70 per cent of the labor force in livestock farming and over 90 per cent of the activities related to care and management of dairy animals are carried out by the women
- A 1 per cent increase in livestock income would reduce inequality by >4 %

[1]Paper produced as part of Phase-II of an IFPRI-FAO project entitled" Livestock Industrialisation, Trade & Social-Health-Environmental Impacts in Developing Countries" funded by DFID-UK
Discussions during consultations in Patna, February 2006

- The livestock sector provides supplementary income to over 70 per cent of the rural households
- Milk production contributes on average 27 per cent of the household income; its contribution varies from about 19 per cent in the case of large farmers to about 53 per cent in the landless category

The relevance of the livestock sector at the national can be seen in terms of the fact it contributed 5.5 per cent to the GDP and provided employment to 4.9 percent of the workforce in 1999- 2000 (see table 2.1 below)

Table 2.1: Contribution of agriculture and livestock in income and employment during the 80s and 90s[2]

Years	Per cent in GDP		Proportion in total employment	
	Agriculture	**Livestock**	**Agriculture**	**Livestock**
1983	34.7	4.8	66.3	4.5
1987-88	28.3	6.2	63.9	4.3
1993-94	28.4	6.5	62.5	3
1999-'00	24.9	5.5	57.4	4.9

While at the disaggregated level there is lack of comprehensive published estimate linking milk output with the number of persons employed, there have been small attempts by individual researchers to arrive at some reliable estimate for the same. Primary data collected by Jha (2000) revealed that in a typical village herd, one milch animal (average of buffaloes, cross-bred and *desi* cows) during a calendar year provides an average of 12.5 quintal of milk and employs 66 man-days of labour. One quintal of milk thus generates 5.5 man days of employment in the Kurukshetra district of Haryana. [3]

[2] *Note*: The distribution of livestock sector outputs during the year 1999-2000 with their share in the parentheses are milk (68 per cent), meat (17 per cent), eggs (3 per cent), honey inclusive of silk (1 per cent), dung obtained from various livestock (8 per cent), livestock inventory (3 per cent).
Source: Dairy India 1997 (also quoted in Jha, B., India Dairy Sector in the Emerging Trade Order, IEG, New Delhi)

[3] Jha, B (Ph.D. Thesis, 2000), India Dairy Sector in the Emerging Trade Order, IEG, New Delhi

The secondary information also provides similar estimates. The NSSO employment figure at the aggregate level on the basis of current daily status (CDS) shows that employment in the livestock sector was 16.5-million person years during the year 1999-2000. If we assume that share of milk and milk products in total livestock employment is as per its share in the value of output, employment in milk and milk products would have been around 12 million person years. The milk output during the year was 731 million quintal; therefore, employment created for producing one quintal of milk has been around 5.8 man days at the all India level.

A relatively higher employment figure from secondary information as compared to primary data is conceivable since the primary data pertains to a high productivity region, whereas the secondary information at the all India level is the average of high as well as low productivity regions of the country. The study by Jha (2000) however, assumes that one quintal of milk production generates 5.8 mandays of employment. This estimate has been assumed to be uniform for all the selected states of the country namely Haryana, Maharashtra, TamilNadu, West Bengal and Uttar Pradesh.

It is assumed that even with mild doses of increases in productivity in the dairy sector in Bihar, the employment potential will still continue to be high. Given the current production at 3180 thousand MT of annual production in Bihar, and the above assumption of 5.8 mandays of employment generated from production of one quintal of milk, it is estimated that nearly 184 million mandays of employment is likely to be generated in the sector. Further, this translates in providing at least 5 lakh persons an employment round the year. We also need to take into account that this is an indicative estimate to which, one will need to add the production in the unorganized sector (i.e. that part of the production which has still not been able to network with the cooperative sector) and also adjust the estimates to the likely changes in the productivity levels.

The significance of the sector can further be assessed by way of an example with a farmer owing just a pair of buffaloes. Assuming an average yield of 5-6 litres daily from each animal, an additional income of almost Rs.5000 per month is assured for 300 days in the year. This when compared with income that may be generated by at least under 100 days of guaranteed employment in a financial year under the National Rural Employment Guarantee Act 2005, clearly highlights the potential of the dairy sector on rural livelihoods.

Dairying can, therefore, be considered as a low-cost effective tool for rural transformation in Bihar, also on account of the fact that it requires comparatively low levels of investment (in the order of Rs. 25,000-30,000), minimal gestation period, limited skilled/specialised training. Given that farming is characterised by dominance of peasant farmers and that farmers generally practice mixed farming (supported by one or two cattle heads for draught power and own milk consumption requirements), there is a consensus that promoting dairying will further strengthen its symbiotic relationship with agriculture in the State.

While these are some of the rationale for promoting the dairy industry, it emerged during the Consultation that in the current scenario, Bihar has not been able to realise the potential of the sector. For instance, there exists a strong demand-supply gap as far as the production and consumption of milk is concerned. Further, estimates by COMPFED indicate that there is a marketable surplus of nearly 47.92 lakh kgs/day of milk and the urban demand potential is in the order 9.33 lakh litres per day. This poses a serious question i.e is the State moving to an excess supply situation with a glut in the local market?

In light of above, an attempt has been made to undertake a situation gap analysis of the sector that has enabled identification of not only constraints and needs of the stakeholders ,and also highlighted the relative strengths. Based on this, agenda for action has also been formulated.

2.2 DAIRY SECTOR – AN OVERVIEW

While the importance of the dairy sector is well recognised, the emphasis that it has received in the various five year plans does not seem to be in conformity. Mild doses of public intervention staggered over the five-year plans in the period of 1950s-1980s, could only at best provide some momentum for limited growth of the dairy sector in Bihar. Various milestones towards the development of the sector in the state can be presented in a tabular form as below:

Table 2.2: Milk wave in Bihar[4]

First Plan (1951-55)	Dairy development work initiated in Bihar. Three dairy plants at Patna, Muzaffarpur and Bhagalpur established.
Second Plan (1956-60)	A dairy wing was created in State Government
Third Plan (1961-66)	New dairy plants at Patna (10,000 LPD), Gaya (6,000 LPD) and Barauni (2,000 LPD) established.
Fourth Plan (1967-74)	Barauni plant expanded to 1 LLPD and Bhagalpur to 6,000 LPD. Two new plants at Bokaro and Ranchi set up.
1970	Bihar included under Operation Flood(OF)-I
March 1972	Bihar State Dairy Corporation set up as implementing agency of OF-I
1973	One milk union, namely Patliputra Dugdh Utpadak Sangh established
1978	One 1 LLPD plant established at Patna
1979	A cattle feed plant established at Patna
1983	COMPFED was created as an apex body of dairy cooperatives. Era of cooperative dairying started.

As is evident from the above table, technical and institutional measures do not seem to have been taken up with any long-term growth perspective in mind. For instance, capacity expansion of existing dairy plants or setting up of new ones did not come with heavy doses of institutional measures that could have provided the enabling framework for the sector to plan for the medium and long run. The establishment of COMPFED in the early 80s, however was a definite and bold step and can be seen as a watershed in the so far neglected institutional mechanism to give a fillip to the relatively informal structure of operations within the dairy sector in the state.

2.2.1 Existing Dairy Infrastructure – locating the intervention points

On the basis of data available in the public domain, the dairy network as existing today in the State can be presented in the form of table as follows:

[4] COMPFED, February 2006

Table 2.3: Geographical spread of key dairy infrastructure[5]

Components	No	Coverage area
No .of Dairy Plants	9	Fair coverage except North Bihar
No. of Chilling Plants	9	Relatively fair coverage except North-eastern districts of Bihar
No .of Bulk Cooler	5	Less coverage. North-eastern part has only one while eastern part does not have any coolers.

The data further suggests that the combined milk processing and milk chilling capacity of the all the plants in the state is 760 TLPD and 180 TLPD respectively. Of the existing milk processing capacity, nearly 32 per cent is managed by the apex body of cooperatives - COMPFED. Similarly, of the total cooling capacity (39 TLPD), nearly 23 per cent is managed by COMPFED. In terms of the area covered , the above table indicates that while existing network fairly covers the state, north and north-eastern parts are totally uncovered. In quantitative terms, it might be worth noting that 32 per cent of the state's milk processing capacity and 23 per cent of the cooling capacity covers over 70 per cent of districts in Bihar.

The facts presented above clearly highlight not only the inadequateness of existing capacity, but also its skewed distribution in the state. It can, therefore, be inferred that any intervention to improve the dairy network needs to adopt a two-pronged approach. While emphasis should be given to capacity expansion and optimum utilisation, its even distribution across the state also needs to be ensured.

2.2.2 Manifestations of the Constraints

The table on state-wise estimates of milk production (see Annex)[6] indicates that while there has been an increase in the milk production during the period 1997-98 to 2003-04, for all the states including the neighbouring states of Uttar Pradesh and West Bengal, there has been decline in the milk production in Bihar. While it ranked 11th in 1997-98 , with share of less than 5 per cent in total milk production in the country , it

[5] COMPFED, February 2006

[6] Department of Animal Husbandry, Dairying and Fisheries

has slipped down to 12th position with even lesser share in 2003-04 (less than 4 per cent).

Lack of focused institutional support (in terms of organisation of procurement, and further marketing to the final consumers) and a relatively hesitant capacity expansion could be the major reasons for the above noted decline.

In terms of procurement and marketing of milk (vis-à-vis production), the existing scenario can be explained through the table given below:

Table 2.4: Milk procurement and marketing: Current scenario[7]

1. Production	
Annual Milk production ('000 MT)	3180
Per day production (lakh kgs)	87.12
Consumption in Villages (lakh kgs per day)	39.20 (45%)
Marketable surplus (lakh kgs per day)	**47.92**
2. Procurement	
Milk procurement by cooperatives (lakh kgs per day)	4.89
Procurement as % of marketable surplus	**10.2**
3. Demand & Marketing	
Urban demand of milk (llpd)	9.33
Marketing of milk (llpd)	4.67
Marketing as %of total urban demand	**50%**
4. Coverage by COMPFED	
Cities/towns covered	80
Coverage as % of total towns	**62**
Total outlets supplying milk	5443
Population covered per outlet	**1700**

The above table clearly shows that nearly half of the milk production is available as marketable surplus, after meeting the consumption requirements at the village level. Despite the well-documented story of COMPFED, the procurement is limited to nearly 10 per cent of this surplus. This amounts to a situation of limited accessibility (read institutional support) to almost 90 per cent of the available marketable surplus.

[7] COMPFED, February 2006

From the marketing aspect, the above indicates that only 50 per cent of the urban demand is being met with the existing marketing set up. Moving further in the supply chain it can be observed that nearly 40 per cent of the towns/cities in the state are uncovered. An year-wise calculation of the annual growth rate of milk procurement and marketing as given below, further explains the gap.

Table 2.5: Milk procurement and marketing: 1994-95 to 2005-06 [8]

Year	Milk Procurement –MP ('000 kg per day)	MP: Simple Annual GR	Milk Marketing -MM ('000 litres per day)	MM: Simple Annual GR	Glut (MP-MM)
1994-95	114.33		166		-52
1995-96	159.09	39.15	179	7.83	-20
1996-97	195.82	23.09	210	17.32	-14
1997-98	203.15	3.74	241	14.76	-38
1998-99	194.1	-4.45	304	26.14	-110
1999-2000	281	44.77	316	3.95	-35
2000-01	331	17.79	327	3.48	4
2001-02	351	6.04	332	1.53	19
2002-03	385	9.69	379	14.16	6
2003-04	403	4.68	451	19.00	-48
2004-05	489	21.34	467	3.55	22
2005-06	575	17.59	500	7.07	75
Average	**306.79**	**16.67**	**336.91**	**10.80**	-30
CAGR	**-0.58**		**-0.75**		**-1.12**

The above table clearly indicates that while milk procurement has grown at a simple annual average growth rate of over 16 per cent, marketing has grown only by close to 11 per cent. The compound annual growth rates (CAGR) during the period 1994-95 to 2005-06, however show an entirely different picture. Both, milk procurement and milk marketing have shown a negative CAGR of 0.58 and 0.75 per cent per annum, respectively. It appears that the declining growth rates of marketing in a given time period adversely influences the milk procurement in the successive time period. It may be , therefore, construed as an indicator warranting suitable interventions, whereby milk marketing channels are strengthened, leading to an increase in milk marketing across various product lines/categories and geographies and bringing more milk

[8] Derived from data from COMPFED, February 2006

producers under the co-operative umbrella (of existing agencies such as the COMPFED or the new ones).

A time bound action plan, therefore, demands the following:

1. Increase the procurement of milk from the current 10 per cent of the marketable surplus (i.e. approx. 5 lakh kgs per day) to atleast 20 per cent (i.e. 10 lakh kgs per day)

2. Assuming 2 milk yielding cattle per farmer, with an average daily yield of 5 litres each, the procurement mechanism would need at least 1 lakh milk producers to be brought quickly under the cooperative umbrella. The dairy department and the cooperative department would have to work in tandem to meet this target in a period of 3 months.

An obvious question at this juncture may be why are we giving ourselves a time frame of 3 months to achieve the above target. The answer lies in the fact that the above steps would in the best case scenario be able to raise the procurement to nearly 20-25 per cent of the total marketable surplus. A fast paced initiative in the next 3-4 months, would even allow the planners, policy makers to review the progress and consider steps for absorbing the remaining marketable surplus (assuming no growth in rural demand). Simultaneously, milk producers in the hitherto uncovered geographical areas may initiate a process of bringing an institutional change in their milk production and linking up with organised supply chain that builds on the principle of cooperative business.

In light of above, clearly there is a need for stepping up the infrastructure and institutional support not only for procurement of this large surplus but also for enhancing marketing support in terms of institutional and retail linkages to enhance market penetration.

Moreover, if one looks at the urban demand supply gap, it is found that if the procurement were at least increased by twice the current level, the urban demand could be easily met. In the immediate run, therefore, there is a need for bringing in more cooperatives under the umbrella of COMPFED or creating a mechanism, whereby the small or petty milk producers are able to reach the market directly. It is here that a direct interface of the cooperatives with potential segments of daily or regular buyers of milk may be arranged, through district level meetings or workshops. It is suggested that the department concerned with development of the dairy sector in

the state could do this mapping exercise and facilitate the enhancement of milk procurement, to at least 20 per cent of the available current marketable surplus.

While the procurement is enhanced, it is also suggested that Dairy Department either through COMPFED or through independent agencies conducts a detailed market research study that can assess not only the demand and supply dynamics but also advise on the feasibility and the nature of marketing linkages/ mechanisms that need to be established in order to address the demand –supply gap.

Towards this, an attempt has been made to undertake a value chain analysis, which highlights the stakeholders and their role in the chain, the constraints and suggest possible points of intervention. It is however, suggested that a detailed study on the identified constraints and the associated financial implications be undertaken, basis which a time based action plan can be formulated.

2.3 UNDERSTANDING THE SUPPLY CHAIN

A conventional supply chain and the linkages between various entities can be explained schematically as following.

The diagram below describes linkages between seven main entities starting from milk farmers to the end consumers in the supply chain. Although there are various associated intermediary entities that are spread along the supply chain, for simplification purposes the number of entities have been limited to seven and grouped into two levels.

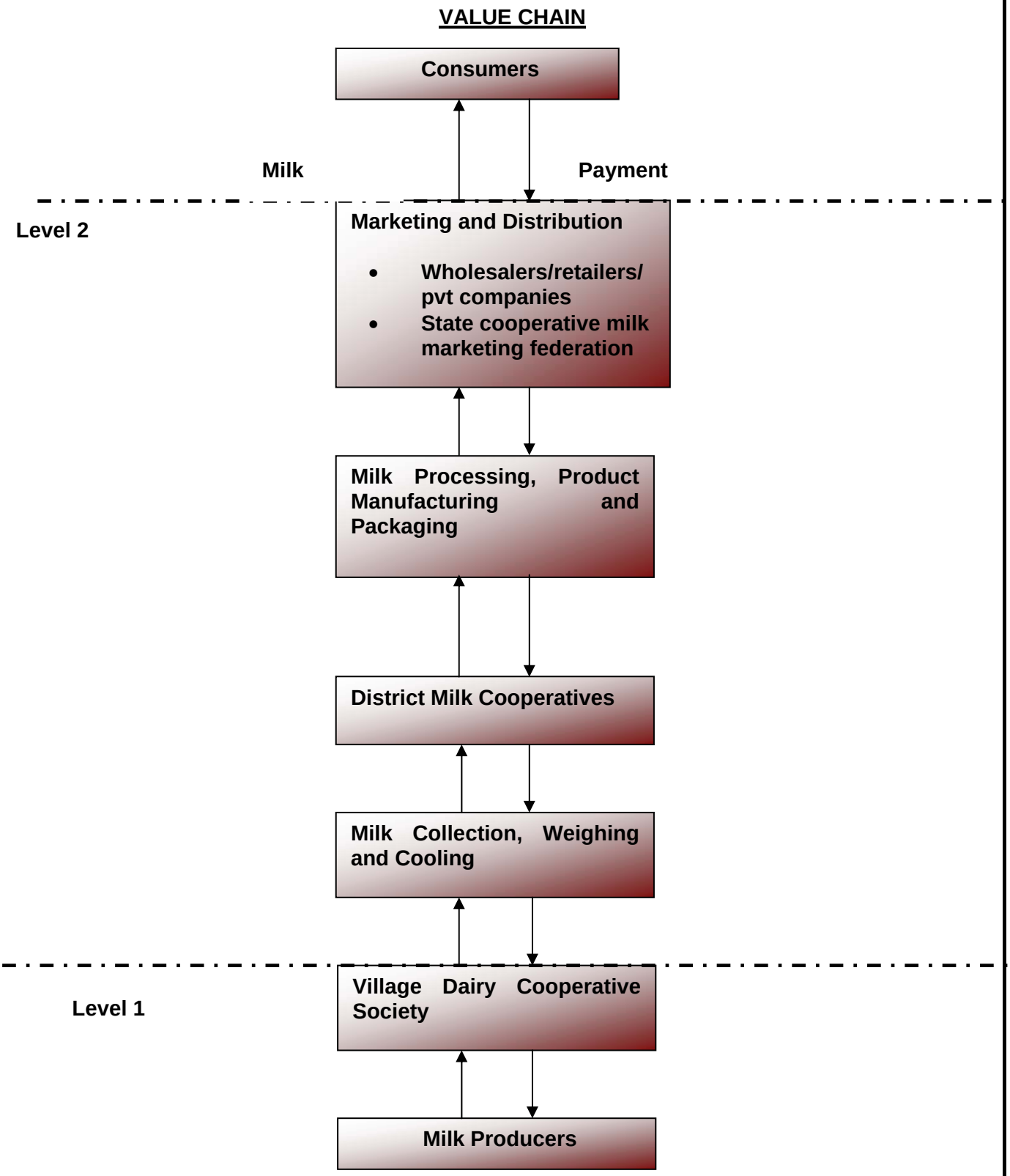
Level 1 comprises two stakeholders - milk farmers and village dairy cooperative societies that are involved in following activities:

- milk farming &
- collection of milk at the village level from all the farmers

Level 2 comprises stakeholders such as district milk cooperatives, milk collection, weighing & cooling agencies, milk processing agencies and marketing & distribution agencies. As is evident, these stakeholders are involved in the following activities:

- milk collection, weighing and cooling
- milk processing, product manufacturing and packaging &
- marketing and distribution

Figure 2.1: Conventional supply chain for the dairy sector



The activities highlighted at various levels can either be performed by multiple entities or by a single entity as in the case of COMPFED that acts as a nodal agency in the State for performing all the activities under Level 2. It is recommended that the quantification exercise of various variables across the supply chain may be undertaken immediately to spell out the programme interventions.

In light of the existing dairy scenario in the State, this supply chain framework (for both the levels- level 1 and 2) has been mapped with the existing network so as to locate the constraints, needs and alterables and identify the broad contours of an agenda for action for growth of the sector.

2.4 LOCATING THE CONSTRAINTS IN THE VALUE CHAIN

Mapping of dairy network with supply chain framework (as mentioned in the earlier section) at both the levels helped in locating four broad categories of constraints. Although there exists a certain degree of overlapping owing to interlinkages and nature of entities and activities, constraints have broadly been classified into:

1. Infrastructural constraints (including marketing infrastructure)
2. Operational constraints
3. Marketing constraints
4. Financial constraints

1. ***Infrastructural Constraints*** – Data available in the public domain suggests that Bihar lags behind other states in infrastructure indicators. In power sector, the state witnesses low tariff collection, high transmission and distribution losses. While low collection has posed financial burden on the state electricity department, it has also restricted improvements in the infrastructure and maintenance, which has further aggravated the power crisis. In the discussions during the consultations, it was highlighted that 70 per cent of SME's in the state have power generators. When compared with states offering good investment climate, the corresponding figure is relatively lower at 30 per cent.

   With reference to other infrastructure indicators it was highlighted that road penetration in Bihar is only 77 kms per 100 kms while telephone density is only 0.93 per 100 persons with even lower access for villages (only 40 per cent)[9].

[9] Bihar: Towards a Development Strategy(2005), World Bank , New Delhi

Clearly the State lacks adequate infrastructure, which is an essential enabler for a good investment climate and sectoral growth.

This inadequateness has affected the dairy sector in a dual manner. From the supply side, it has directly affected the operations of cooling, storage and milk processing plants thereby restricting value addition. From the demand side, while on one hand it has affected timely consumption/procurement along the supply chain, on the other hand, owing to weak market accessibility/ linkages (with end consumers), it has restricted consumption /procurement of milk and expansion of value added products in the market. This is quite evident from the untapped marketable surplus as has been mentioned earlier in this section, where it was highlighted that even after meeting the consumption requirements at the village level procurement is limited to only 10 per cent of marketable surplus.

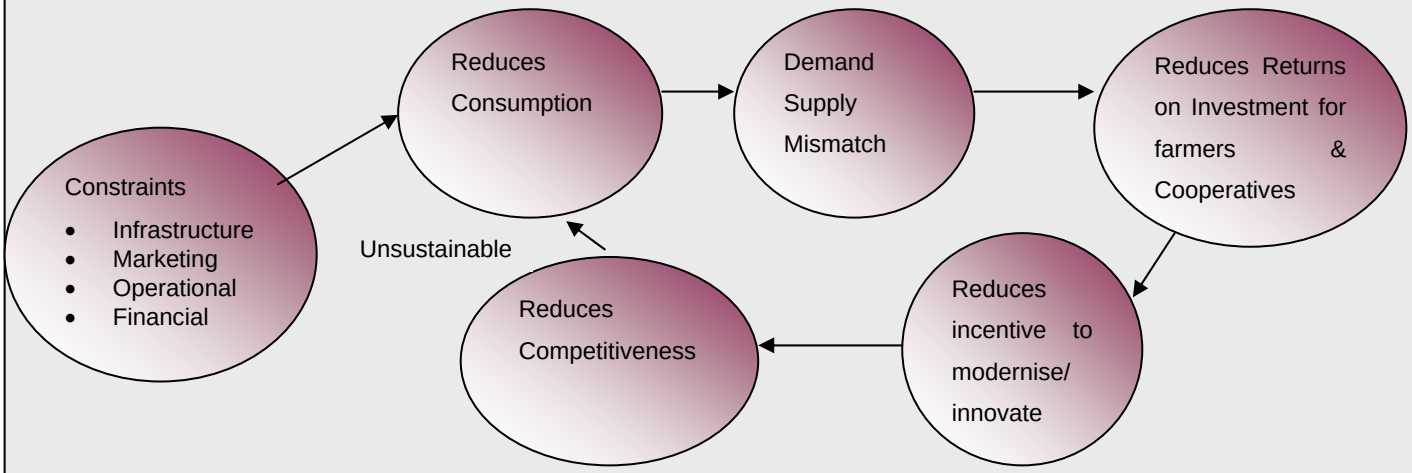
2. ***Marketing Constraints*** – As mentioned earlier in this section, the existing marketing set up for this sector in the State meets only 50 per cent of the urban demand and covers only 60 per cent of the towns/cities. Clearly the growth of the sector is constrained by the existing marketing support in terms of institutional and retail linkages which *inter alia* limits the market penetration. Further, lack of availability of skilled professionals in the areas of marketing and sales (viz creating marketing strategy, product innovation, advertisement, creating and managing distribution network), supply chain management, demand forecasting etc, restrains the growth of the dairy sector in Bihar.

3. ***Operational Constraints*** –In view of the fact that total procurement is only 10 per cent of the total marketable surplus, the significance of having adequate, evenly distributed, modern infrastructure in terms of coolers, processing units cannot be undermined. Further, in order to gain consumer confidence and thereby generate a demand for the product in the market, it is essential to have fully equipped testing laboratories with duly accredited protocols for testing of milk and value added products. On this front also, Bihar is constrained not only by the inadequacy of existing dairy infrastructure (in terms of coolers, processing units, dairy plants and testing laboratories) but also its skewed distribution across the state.

4. ***Financial Constraints*** – Lack of investment friendly climate in the state has constrained availability of financial resources for the development of the sector in the state.

Box 2.1: Vicious cycle of constraints in the dairy sector

The constraints as explained above create a vicious cycle, which can be explained as:



As evident from the above figure, the constraints have direct implications on return on investments for the stakeholders and therefore impact the sustainability of employment and income growth generated directly and indirectly by the dairy sector.

Box 2.2: SWOT analysis of dairy sector in Bihar: At a glance

Strengths:

- **Demand profile:** Absolutely optimistic.
- **Flexibility of product mix**
- **Availability of raw material:** Abundant. Presently, more than 90 per cent of milk produced is flowing into the unorganised sector, which requires proper channelisation.

Weaknesses:

- **Logistics of procurement:** Problems of bad roads and inadequate transportation facility make milk procurement and distribution problematic.
- **Problematic distribution:** All is not well with distribution. But then if ice creams can be sold virtually at every nook and corner, why can't we sell other dairy products too? Emergence of a cold chain linking the producer to the refrigerator at the consumer's home is not a distinct possibility.
- **Technical manpower:** Availability of professionally-trained, technical human resource pool.

Opportunities:

- **Value addition:** There is a phenomenal scope for innovations in product development, packaging and presentation. Given below are potential areas of value addition:
    - Steps should be taken to enhance availability of value-added products like *shrikhand*, ice creams, *paneer, khoa*, flavoured milk, dairy sweets, etc. This will lead to a greater presence and flexibility in the market place along with opportunities in the field of brand building.
    - Addition of cultured products like yoghurt and cheese lend further strength - both in terms of utilization of resources and presence in the market place.
    - A lateral view opens up opportunities in milk proteins through casein and other dietary proteins, further opening up export opportunities.

- Yet another aspect can be the addition of infant foods, geriatric foods and nutritional.

- **Margins:** Quite reasonable, even on packed liquid milk. Across varying grades of milk (measured in proportion of fat content, ranging from 1.5 per cent -6 per cent), the returns are nearly double, except in the case where direct sales are made. The returns in this case are in the order of 30 per cent.[10]

This clearly indicates the need for enabling institutional mechanism to consolidate small cooperatives, thereby rationalising the network, improved usage of inputs and focussed marketing to identified segments.

Threats:

- **Milk vendors, the un-organised sector:** in the current scenario, milk vendors are occupying the pride of place in the industry. However, dissemination of information about the harm that they are doing to producers and consumers should see a steady decline in their importance.

The study of this **SWOT** analysis shows that the 'strengths' and 'opportunities' far outweigh 'weaknesses' and 'threats'. Strengths and opportunities are fundamental and weaknesses and threats are transitory. Any investment idea can do well only when there are three essential ingredients: entrepreneurship (the ability to take risks), innovative approach (in product lines and marketing) and values (of quality/ethics) and this are where this report seeks to draw the attention of stakeholders.Meanwhile success in dairying depends on factors such as efficient and economical procurement network, hygienic and cost-effective processing facilities and innovativeness in the market place. All that needs to be done is: to innovate, convert products into commercially exploitable ideas. As they say, Benjamin Franklin discovered electricity, but it was the man who invented the meter that really made the money.

2.5 NEEDS: THE WAY FORWARD

In light of above, it can be inferred that the sector requires appropriate interventions from the stakeholders both at the macro level and micro levels, in order to realise its potential in the state. These needs are:

- Enabling environment in the State in terms of availability of physical infrastructure – power and road connectivity
- Availability of quality testing laboratories and incentives for adherence to standardised protocols for testing and procedures for packaging and other value addition activities and product innovation
- Expansion of dairy infrastructure and its equitable distribution across the State
- Availability of information technology infrastructure that can provide direct institutional and retail market linkages , exposure to new markets, information about prices, best practices adopted in the value chain etc. Experiences from success stories of rural information kiosks, ITC e-choupal initiative and Drishtee India can be drawn.
- Focus of government on coverage extension of Integrated Dairy Development Programme (IDDP), promoting breed improvement programmes, micro level health insurance also enabled through improved industry-academia linkages.
- Manpower skilled in areas like marketing, sales and supply chain management, dairy farming , animal health etc

[10] IFCN Dairy Report 2003

3 SUGAR- MANY REASONS TO GO AHEAD

3.1 RATIONALE

It has been mentioned at various fora in the recent past that the new Bihar formed out of the recent political division of the state will have to develop its agriculture and agriculture-based industry as its main economic resource. North Bihar, a rich agricultural area, has many industries associated with agricultural products. Given that the state is endowed with fertile land and manpower, sugarcane as a crop provides the much-needed support to overcome adverse conditions arising out of recurrent floods in the northern parts of the state.[11]

There are numerous sugar factories scattered throughout the state. The state has a potential to increase its sugarcane yield by adopting the latest agriculture technologies and package systems. This will not only benefit the farmers but also have a direct effect on the per capita income of state.

3.2 SUGAR INDUSTRY: AN OVERVIEW

On the basis of data available in public domain, the status of network of sugar industry and the productivity in the state is presented in the table below:

Table 3.1: Sugar industry in Bihar: At a glance[12]

No. of Sugar Mills	28
No of Operational Mills	09
No of Closed mills	19
Private Sector	1
Bihar State Sugar Corp.	15
BIC Group	3
Area under sugarcane	2.27 Lakh Hec
Production of Sugarcane	125.82 Lakh MT
Productivity of Sugarcane	55.43 Mt /Hec
Cane Crushed	26.48 Lakh MT
Sugar Produced	2.54 Lakh MT

[11] It is important to note that sugarcane has the capacity to grow in both waterlogged as well as dry areas.

[12] Dept of Cane Development, Govt of Bihar

In the current scenario, the above network has the capacity of producing 37,500 Tonnes crushed a day (TCD) which would be merely 4 per cent to the total national sugar output. This contribution was 30 per cent in the 1980s. The average annual yield of sugarcane in Bihar is 390 quintal per hectare, whereas country's figures stand at 500 quintal per hectare.

Further, Indian Sugar Mills Association statistics shows that the nine operational factories in Bihar had enough cane to crush for 130 days during the 1999-2000 season. However, the supply of cane had shrunk since and the factories could be operational for no more than 82 days in the last season. Cleary most of the exisiting capacity remains unutilised.

This was also confirmed during the discussions in the consultative workshop where it was highlighted that mills that are currently operational are limited only to the northern part of the state, while the other 20 major cane growing districts do not have any sugar mills.

Box 3.1: Contractual forms & cane prices[13]

The presence of varying contractual forms has been documented to have differential impacts on the area under sugarcane cultivation and the prices that cane growers have ultimately obtained from their respective buyers. Obviously, this reveals a story of atypical factor and product market linkages and the relative power of the agents on either side of the market. Typically, in the Indian case, we come across sugar mills that have been either privately-owned mills or those run and managed by sugar-cooperatives. In between this spectrum, there have been the state-run and managed sugar mills. The case of mills in Bihar has been dominated by the latter and few private players.

Comparison of Bihar with All India average on only two parameters viz. Yield and recovery sugar as shown in the following table further provides a reality check on the status of industry in the state.

Table 3.2: Comparison of Bihar with all India average on yield and recovery

Parameters[14]	**Bihar**	**All India**
Yield of sugarcane	48.2%	83.1%
Recovery	8.78%	9.93%

[13] Das, S and Mookherjee, D(2005), Ownership Form and Contractual Inefficiency in the Indian Sugar Industry

[14] Indian Institute of Sugarcane Research

As evident from the above table , Bihar is way below the All India average and major sugarcane growing states like Andhra Pradesh, Maharashtra, Karnataka, and Gujarat. In terms of actual numbers, cane productivity in Bihar is around 40 tonnes a hectare in the state is way below the national average of 60 tonnes a hectare.

In view of the fact that the health of the industry and farmers' rewards for his efforts are decided by the recovery of sugar from the cane they supply to factories and the degree of sugar extraction from cane, the current scenario of sugar industry in the state indicates poor performance and highlights its inability to realise the full potential that the sector can offer.

3.3 UNDERSTANDING THE VALUE CHAIN

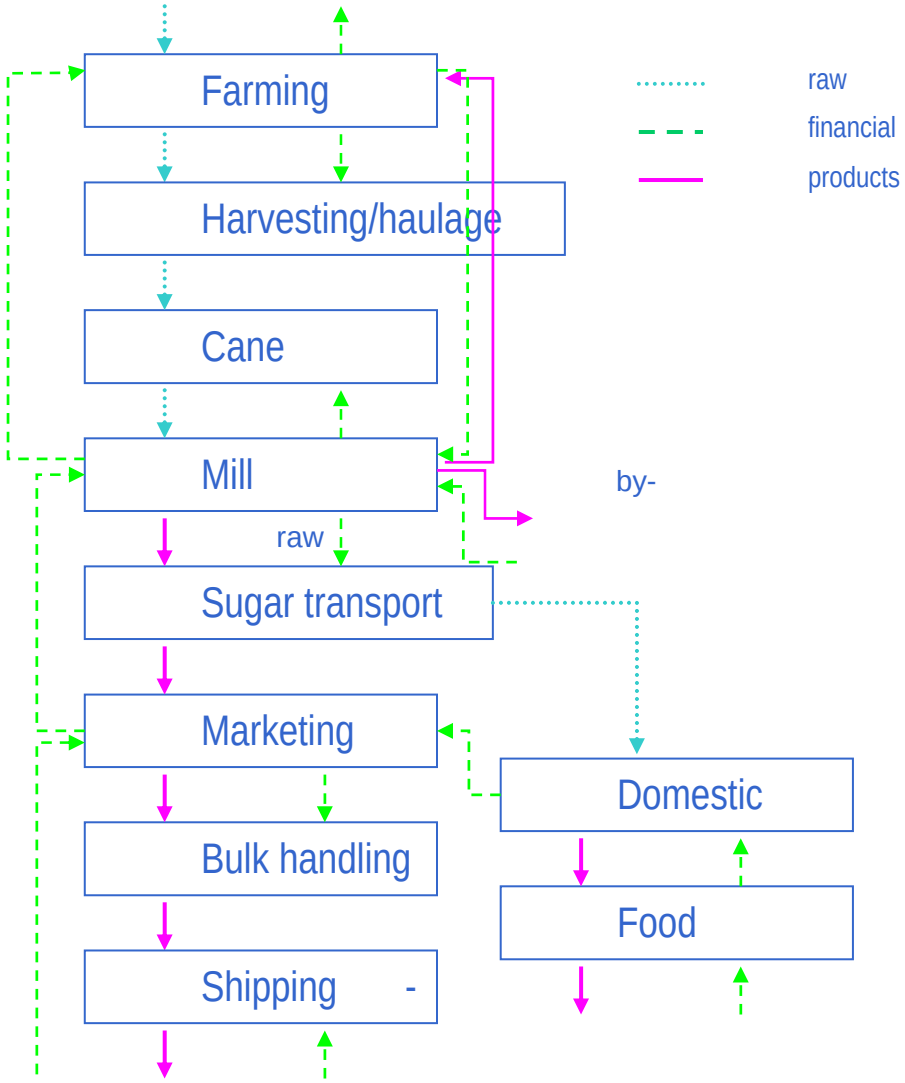
3.3.1 Conventional Salue Chain

The conventional supply chain followed in the sugar industry can be explained as below. The diagram clearly explains the linkages between various entities and value addition. This supply chain as per official estimates involves nearly 500,000 farmers and their dependents in the cultivation of sugarcane and approximately another 150,000 skilled and unskilled personnel, including highly qualified and trained technologists.

Therefore, while it would require detailed value chain analysis, in order to understand the incremental cost and returns for each entity, an attempt has been made to highlight the potential value addition through product diversification at level of mills.

A similar and an in-depth exercise may be undertaken for the entire value chain

Figure 3.1: Conventional supply chain



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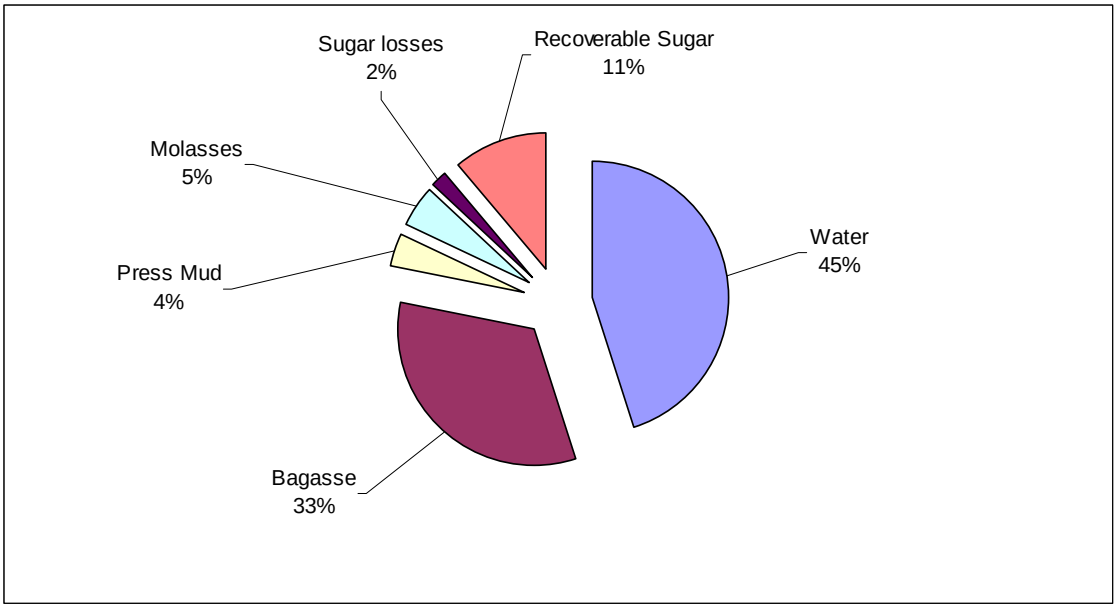
3.4 POTENTIAL AREAS FOR DIVERSIFICATION

Whatever be the state of the industry at this point, the potential that the sector can offer and the role it can play in the development of state cannot be undermined. Further, in light of curent scenario, the sugar mills cannot be viable on the basis of sugar production alone. They will have to diversify. The argument can further be suppoorted with the help of analysis of the sugarcane mix as follows :

Figure 3.2: Typical sugarcane mix

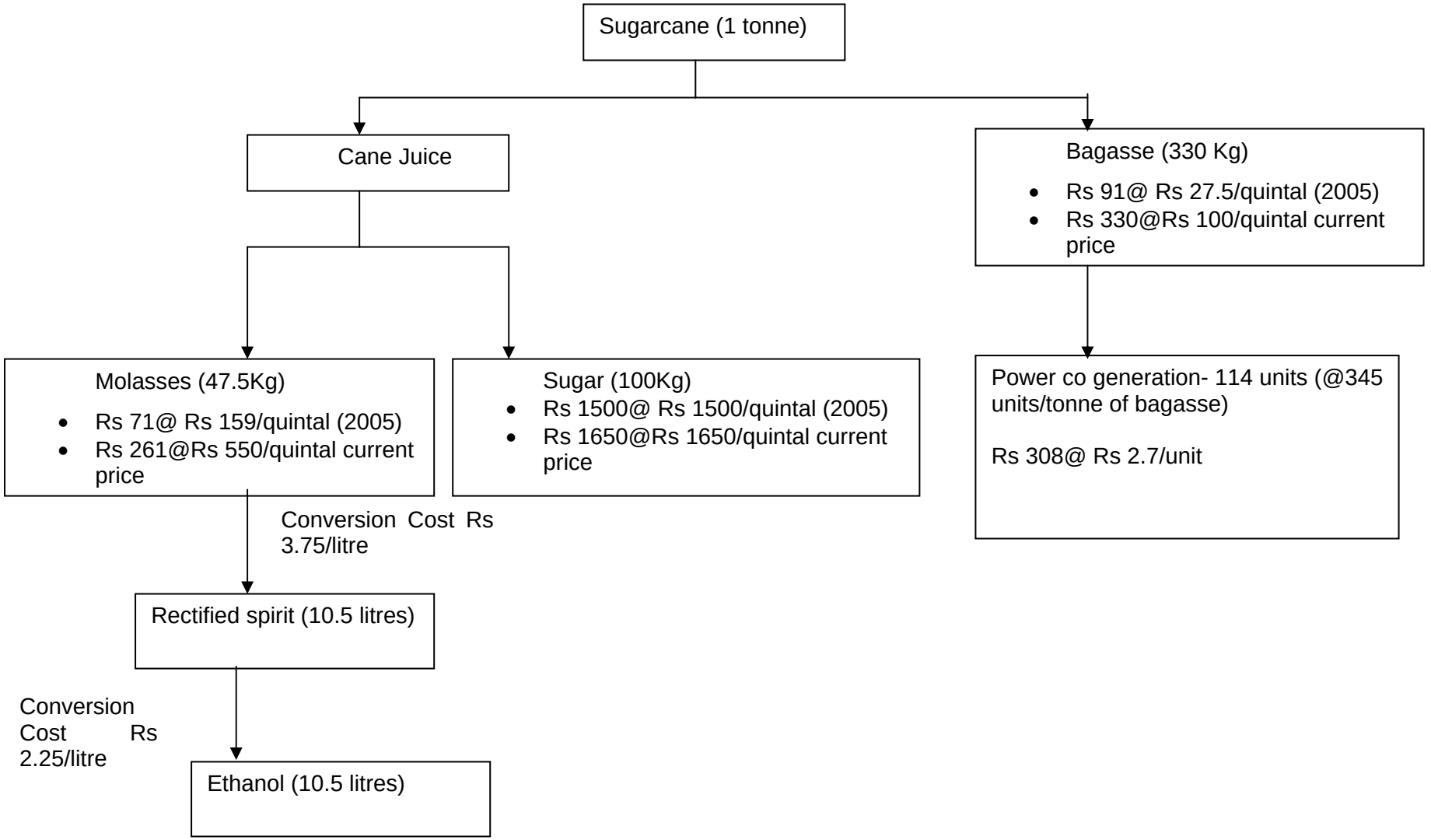


As evident from the above figure, water and bagasse are the primary by products in the sugarcane mix with a share of 45 and 33 per cent respectively. This composition when expressed in quantitative terms (assuming 1 tonne of sugarcane) and analysed in the light of current trading prices, clearly highlights the magnitude of potential diversification can offer.

The flow chart below, clearly indicates the potential of allied industries and therefore investment opportunities in the following areas:

- New Greenfield sugar mills
- Capacity expansion of existing sugar mills
- Manufacturing of bagasse based paper
- Manufacturing of ethanol
- Cogeneration of power
- Manufacturing of molasses based alcohol and commercial spirit
- Manufacturing of sugar based confectionery items
- Organic manure
- Engineering unites related to sugar industries

Figure 3.3: Flow chart highlighting areas for diversification



3.4.1 Ethanol – an emerging area for diversification

Most of the state-owned or co-operative sugar mills are largely stand alone units. Sugar is known to be cyclical in nature. Hence only those mills, which are integrated to manufacture by-products such as ethanol and generate their own power through the use of bagasse, have a bright future. Production of ethanol and co-generation can go a long way to help the sugar mills to improve their viability. At the national level, companies such as BHL, Balrampur Chini, EID Parry and Dhampur etc. are cushioned from such cyclicalities. However, unless mills adopt economies of scale and also there is effective demand for these products in the economy, it would not be easy for the mills to invest and diversify in favour of ethanol and co-generation.

Additionally, the policy initiatives by the government further provides conducive environment for the manufacturing of ethanol. In the current scenario, the government has allowed oil companies to blend upto 5 per cent ethanol with auto fuel in nine states of India. With oil prices hardening, demand for ethanol is expected to further increase in the near future.

However, the option to add ethanol to the auto fuel may be left open. It is felt that till such time this permission of mixing ethanol with fuel is not introduced in the whole country and made mandatory, along with a gradual increase in blending limit to nearly 10 per cent, there is not much likelihood of any substantial jump in the industry's demand.

Some sugar mills which made attempts in this direction in recent years had to suffer because there was no established and generally agreed marketing and procurement mechanism. Even though the Government has granted permission to produce ethanol in a number of states and allowed the ethanol mix in petrol upto 5 per cent, there has been no significant break-through so far, due to lack of clear policy perspective and disagreement between ethanol suppliers and oil companies over the price being charged by the suppliers.

In order to boost ethanol manufacturing the Commission for Agriculture Costs and Prices (CACP) had recommended few years back that the Ministry of Petroleum and

Natural Gas should effectively intervene in the matter of ethanol pricing, get the dispute settled between the ethanol suppliers and oil companies and issue clear and time bound guidelines in this regard. The varying and high levels of taxes by the State Governments that have acted as a deterrent to ethanol production should be rationalized and brought down. Restrictions on inter-state movement imposed by states should be removed.[15]

The CACP had further suggested that cost of transportation must be added to the total cost of production. For this purpose the Commission examined data of transportation charges of sugarcane by various modes of transport and for different distances involved, received from different states. The transportation cost varies between Rs.4.88 per quintal in Bihar to Rs.15.20 per quintal in Punjab for a radius of 16 – 25 km from the factory gate. The average transportation cost works out to Rs.12 per quintal in the current year. Assuming an annual increase of 5 per cent the likely transport cost per quintal works out to approximate Rs.12.60 per quintal.[16]

Box 3.2: In harmony with the international crude prices[17]…..

The soaring oil prices give Bihar a chance to grow out of its wrenching poverty relatively costlessly, via cultivation of sugarcane. One consequence of sky-high oil prices has been to jack up the prices of other fuels and fuel substitutes. Ethanol (alcohol that is not necessarily potable because of additives/purity but is essentially the same stuff that gives scotch whisky its kick) is a beneficiary of this effect.

Ethanol is made directly or indirectly from sugarcane, the other main product derived from cane being sugar itself. The world output of alcohol and sugar is around 150 million tonnes each.

Given the diversion of sugarcane for producing alcohol, sugar prices have been surging, the world over. (The commodity cycle and a WTO ruling against the European Union's sugar subsidies add to the upward pressure on sugar prices.) Global sugar prices are roughly two-thirds higher than their level a couple of years ago. In India, alcohol will be blended into petrol. To begin with, blended petrol will have 5% alcohol and later 10%. (Significantly higher levels of ethanol in petrol call for modification of vehicle engines.) This means there could be an additional demand for alcohol of close to one million tonnes a year just for fuel, not taking into account the product's use familiar to the layman.

The demand for sugar is also expected to go up, in both India and China and other developing countries in the near future. In fact, sugar consumption has tended to move up with an increase in people's incomes. India's per capita consumption, at around 14 kilos a year, is around a fifth the US level. The American sugar consumption levels could well come down, but India's would

[15] Source: CACP, Report on Price Policy for Sugarcane, for the 2004-05 Season

[16] Source: CACP, Report on Price Policy for Sugarcane, for the 2004-05 Season

[17] Arun, T.K , Economic Times, February 2,2006

definitely go up. So would those of a host of fast-growing developing countries. Brazil, the leading producer of sugar, would gain from the increased demand for both ethanol and sugar. But so can India. These bright prospects for sugar might be good for the leading lights of our sugar industry, but how does Bihar benefit? Bihar is the most ideally suited place in India to grow sugarcane — in terms of its distance from the equator, soil type and water availability. Floods are Bihar's bane. But floods also make Bihar's plains extremely fertile. Sugarcane can survive being completely submerged up to four days. It is the most ideal crop for a flood-prone area like Bihar. The natural fertility of the soil of Bihar's inundated plains would make Bihar one of the least-cost producers of sugarcane. Water-scarce Maharashtra could never match Bihar in terms of cost-efficiency when it comes to cane cultivation. However, a more conducive industrial climate with features as highlighted above and ample scope for diversification, is more likely to convert the state's sugar capital as more productive.

A peculiar feature of the sugar industry is that 'just-in-time' management practices are built into it. Cane has to be crushed not later than 24 hours after being harvested, ideally within six hours, to maximise recovery of sucrose. So factories have to be located near sugarcane fields.

Sugar, like most commodities, displays cyclical behaviour in terms of production and profits. What high oil prices do is to superimpose on this commodity cycle sustained demand for sugarcane to produce the fuel-substitute ethanol. Sugarcane prices have shot up this crushing season, which runs from October to March. Shortage of cane has sharply lowered capacity utilisation in Uttar Pradesh sugar mills.

High prices of sugar and higher demand for sugarcane could fast-track investment decisions in Bihar and present the state with a great opportunity to kick-start a new sugar/ethanol industry and widespread cane cultivation. What the government needs to do is to guarantee safety of life and property at new mills, guarantee payment for cane purchases from farmers, guarantee offtake of surplus power co generated at the sugar mills and build some good roads from the factory locations to the nearest railway station.

By the time the next crushing season begins, a lot of people in Bihar could be in a position to raise their own indirect demand for sugarcane to celebrate the high price of oil.

The national production of sugar is estimated to be in the order of 18 million tonnes, with consumption exceeding production by approximately 1.5 million tonnes. Being a net importer of sugar in the global market and the consumption expected to go up (both in the domestic and national market), the prices are expected to harden and move northwards. This tendency is also expected to be further strengthened by the narrowing national price of sugar and jaggery (Rs. 23/kg and Rs. 17/kg) and consumers in the urban market likely to graduate to exclusive sugar consumption.

At the global level, the sugar production is contributed by nearly 110 countries with largest producer Brazil, followed by India. With the market leader, Brazil deciding to divert its 50 per cent (approx) of cane crushing capacity to ethanol, the availability of sugarcane would be reduced significantly, thus restricting production increases. That a shortage is being created can be assessed from the prices of raw sugar reaching a 10 year high at above 10 cents a pound, and the international price of sugar having touched

$ 380 per tonne (f.o.b). Moreover with the WTO pressures on reducing subsidised exports, the global inventories of sugar are expected to further decline. The fact that the global crude prices are hardening, ethanol becomes a lucrative option for diversification. Bihar stands a good chance to make hay while the sun shines on account of the hardening of global oil prices.

3.4.2 Gur Production: scope for diversification

In a diagnostic study done under the aegis of UNIDO for the Madhepura Gur Cluster (2001), the cost-benefit analysis indicated that gur production has the potential for value addition of the order of Rs. 19.60 per quintal. The SWOT analysis further states that the Madhepura Gur cluster has a huge scope for product diversification and is of great significance for employment generation and economic development in the rural sector. Further the analysis also suggests that the product diversification of sugarcane into gur production should be pursued while keeping in mind the obvious threat to growth of gur mills from setting up of mini sugar mills. The degree of complementarity and competition between sugar crushing and gur production will therefore have to be duly recognized and then further steps for product diversification for manufacture of gur should be pursued. The contribution of sugar industry in Bihar to the All India production is estimated to be a meager 3-4 per cent as only an insignificant number of private sugar mills (4-6) are currently operational.

In Bihar, (particularly the Madhepura cluster), the UNIDO study found that due to a lack of knowledge and availability of latest variety of seeds, the farmers are generally cultivating conventional variety i.e suitable for all types of soil (B.O.91) variety in waterlogged areas. Although they can grow other varieties, which would give them a better yield, they prefer to go for their traditional ways.

Box 3.3: Cost benefit analysis of Gur production[18]

Generally 10-quintal sugar cane produces one quintal of Gur. On an average a unit crushes 150 quintal of sugarcane and thus produces 15 Quintal Gur per day.

Cost of 150 Qtl sugar cane @ -55/= per quintal: Rs. 8250
Labour cost per day: Rs. 200
Cost of diesel per day: Rs. 170
Cost of cleaning materials & chemical: Rs. 20
Cost of Repair maintenance per day: Rs. 40
Interest on capital: Rs. 50
Depreciation on fixed capital: Rs. 30
Cost of packing material: Rs.300
TOTAL COST OF PRODUCTION OF GUR Rs.9060
Average Market Price of Gur : Rs.800 per quintal
Return from sale of 15 quintal Gur : Rs.12000
Profit Amount= 12000-9060 : Rs.2940

Hence,
The farmer who chooses to sell raw sugarcane earns Rs.8250
The farmer who processes the sugarcane into Gur earns Rs.2940

Total Value Added by Gur production @ Rs19.60 per quintal

It is estimated that the market for gur is ever expanding. However to be able to tap this, the productivity and efficiency in production would have to be significantly enhanced. The access to finance through rural cooperative banks would have to be made easy for the gur manufacturers. Reduction in tax levy on the sale of gur would also have to be considered by the state government to allow an even playing field for gur manufacturers in Bihar with its competitors in its neighbouring states of Uttar Pradesh and West Bengal. Additionally, the government agencies will have to undertake an accelerated extension service and enable easy availability of seeds of high yielding varieties.

3.5 CHALLENGES

This section identifies some of the major challenges determining the poor performance as highlighted in the above section.

[18] Source: Adapted from UNIDO Study on Madhepura Gur Cluster, 2001

1. Declining areas under cultivation

One of the major challenges for Bihar has been the declining areas under sugarcane cultivation. With large number of sugar mills currently closed and the private millers being reported to backtrack from the agreed prices, the incentive for cane planting in Bihar has been rather missing. Moreover, with the dominance of large number of small growers (owing to increasing fragmentation of land due to demographic pressures), one finds that the small farmers have been shying away from cane cultivation.

Further, the farm infirmity that exists in the state ensures that the farmers are condemned to low productivity and factories to poor rate of sugar recovery. In this context, it is not surprising that many farmers in the state have opted out of growing cane and land under the crop has shrunk to 110-120 lakh hectares, constituting a negligible percentage of the national cane area of about 4.4 million hectares. Industry officials however, complain that in a long time, Pusa Research Institute has not released any new variety of high sugar-yielding cane suitable for Bihar.

2. Absence of any price regulation mechanism

On account of the monopolistic powers exerted by the millers (i.e buyers of cane) farmers in Bihar get unremunerative price for their produce. Additionally, the rising fragmentation of land, particularly in northern parts of Bihar (the main cane growing areas) has given opportunistic occasions to the factory managers (read the private millers) to under-price cane which in turn has led to highly price elastic supply of cane from the (small) cane growers in the state.

The other aspect that drives the need for price regulation is cyclicality. Sugarcane follows a 5-7 year cycle in which a 2-3 year high production phase is followed by a 3-4 year low production phase. High production phase results in surplus, leading to lower realisations and thus lower profits for sugar mills. Increasing cane arrears force farmers to shift to other crops- resulting in lower production and thus scarcity. The shortage of supply leads to better realisations and thus higher profits for the mills. The cane payment revives farmer's faith in the crop and the cycle repeats. Moreover, sugarcane crop is critically dependent on the monsoons. Excess or scarcity of rainfall tends to adversely

impact the yield. The sugar manufacturers in this case get an indirect benefits by way of an increased sugar price on account of scarcity of sugar.

The existing Minimum Support Price (MSP) announced by the Central government (based on the recommendations of the CACP) also needs additional support in the form of SAP (State Advise Price) from the state government.

Basis above it can be clearly inferred that the state needs a price regulation mechanism especially in procurement of cane.

3. Absence of structured trading

As informed by the buyers of sugarcane, prices are fixed unreasonably high on political considerations. While bolstered by the high prices, the farmers tend increase the area under sugarcane, use of ancient seed varieties and outdated production techniques (growing sugarcane through tissue culture is almost unheard of) increases the production costs.

In Bihar market forces are not allowed to estimate demand, determine cost of production and the market price of the produce. At the same time while imports are cheap, it is discouraged by a high customs duty. As a result, both the mills and farmers suffer. While on one side excess production forces farmers to divert sugarcane to less remunerative options like khandsari and jaggery-making on the other side, mills survive by producing byproducts like power from waste.

These distortions clearly highlight the need of a structured trading system for commodities like sugar. In order to ensure survival of the industry in the long run, demand and supply will have to be allowed to determine the production of sugarcane and the market forces to dictate the survival of the fittest mills only. The governments (both in states and at the Centre) will have to confine their role to putting up and maintaining an efficient infrastructure, providing farmers and mills a level-playing field. State intervention will have to be only during periods of crisis.

4. Inadequate infrastructure

Physical infrastructure in the form of irregular power supply and absence of other enabling factors like availability of credit and reasonable interest rate has also constrained mills in leveraging the potential and thereby reducing the competitiveness at the global level.

The falling availability of sugarcane coupled with lack of availability of physical infrastructure, has left the state, which once housed 20 per cent of the country's sugar factories,with only nine mills.

In terms of other infrastructure indicator viz, road connectivity also the state fares badly in comparison to other states. Industry feels that the poor road connectivity between farmland and factories and high cost of transportation have been a disincentive for growing cane.

Importance of pucca road is underpinned by the fact that more the time taken to transfer cane to factories on harvesting, poorer will be the recovery of sugar. In this context, it is recommended that since quite a sizeable portion of funds earmarked for village road development remains unspent, the development council attached to each sugar factory and headed by District Magistrates may be allowed to use at least 75 per cent of the total budget for building of roads and bridges in factory reserved areas.

Industry officials suggests that sugar factories in the state should be engaged in cane crushing for at least 165 days in a year. However, in order to make this happen, huge infrastructure deficiencies that exists in the current scenario needs to be overcome through joint efforts of central and state government and cane development work.

Private sector players like the K K Birla group and Riga Sugar who have continued there investments in Bihar through all the trying years and the ones like Bajaj Hindusthan, Rajshree Sugar and Dhampur which are looking at the eastern state for building new factories make have also made it clear that for Bihar to regain its rightful place in the country's sugar industry, the government will first have to address the infrastructure and law and order issues.

5. Inadequate irrigation and poor flood management system

It is well recognised that for the cane crop to be healthy, the growing field needs to be irrigated five to six times between March and the onset of the monsoon. But this is possible if only annual maintenance work of canal is completed by February and both state and privately owned tube-wells could be run with power from the grid. While this holds true, Bihar in the current scenario lags the appropriate irrigation system

In addition, floods regularly visit north Bihar during the monsoon, thanks largely to unannounced release of water by Nepal. The high levels of silting of Bagmati, Buri, Gandak and Manusmara rivers and the absence of a drainage system leads to cultivable land remaining submerged for many days and thereby limiting sugarcane production

3.6 CHANGING SCENARIO: POSITIVE INDICATIONS

Given that more than 227,000 ha of area is under sugarcane cultivation, and total production is in the range of 125 lakh MT, and the industry registers a low recovery percentage of 10 per cent, the discussions clearly articulated the areas for intervention, along with identification of investment opportunities and the desired forms of incentive structures. The investments are suggested to be undertaken in specific areas such as capacity expansion of existing sugar mills, manufacture of ethanol and molasses based alcohol etc. There are however, some positive indications towards the government's approach in creating favourable atmosphere for the development of this sector. These are briefly mentioned below:

1. Announcement on the sugar industry promotion package for building of new factories with minimum daily cane crushing capacity of 5,000 tonnes and expansion of the existing mills to 5,000 tonnes and beyond has caught the fancy of investors is evident from the fact that the government has so far received as many 36 investment proposals. In the framing of investment package, the government has seen to it that it is not accused of favouring only the large sugar entities as it befell the Uttar Pradesh government. One assurance that the investors will need is the allocation of sufficiently large reserved cane area, which is not to be tinkered with in the future. While this will allow new factories to stay in

crushing for nearly six months in a year, they will have the incentive to do comprehensive extension work so that enough cane will be available on factory capacity expansion.

The sugar industry majors in the country have lined up investments worth over Rs1, 000 crore in Bihar. The potential investors include Bajaj Hindustan, the K K Birla groups, The Oudh Sugar Mills and Upper Ganges Ltd, Rajshree Sugar Mills and Dhampur Sugars.

2. Installation of new integrated units and expansion of capacity at some of the existing ones are in the pipeline. The investments, which are waiting formal announcements from the companies, will be the first to be notched up by the new National Democratic Alliance government. The Central government has created a sort of 'thumbs up' mood by offering tax incentives to industry. The subsidy on sugar in Bihar works out to be Rs 1.50 per kg.[19] The Oudh Sugar Mills plans to invest Rs 150 crore in expanding capacity at two existing units by 3,500 tonne crushed a day (TCD). After this, the group's total capacity from three units in Bihar will rise to 15,000 TCD in 24 months. Bajaj Hindustan, which leads the industry with 5.6 per cent share of the market, is also eyeing a unit in the state, preferably in Gopalganj or West Champaran area. Dhampur Sugars too has planned a unit or two in Bihar. It is important to note that they are not looking at a unit below 3,000 TCD, which is an encouraging sign for the industry as a whole. Rajshree Sugar Mills is said to be considering a unit in Chakia. Sources say its will be in the 3,000-5,000 TCD range.

   While some of these may require heavy capital investment, there are a few like manufacturing of sugar-based confectionery items that may require relatively lower levels of investments. The priorities are clear, as far as the stakeholders are concerned. While, the industry lobbies for conducive incentive structure with the government or generates adequate capital for investment, the recent initiatives and the policy statements by the government clearly point the

[19] Nupany, C S , Managing Director of The Oudh Sugar Mills and President of Indian Sugar Mills Association

possibilities of enablers coming of age and it is for the investors and the other stakeholders to harness the advantages from these to the hilt.

3. Identification of specific geographical clusters spread across 14 districts can be seen as a step in the right direction – for most of these districts are the ones that are currently experiencing high rates of out-migration. A growth momentum coming from the sugar belt in Bihar will be a major step in reducing the vulnerabilities of many families of the region.

Box 3.4: Emerging institutional support

After Jharkhand was carved out, the only industry worth the name that Bihar is left with is sugar, no matter how much truncation it has gone through over the years. There is a silver lining in that the government has agreed to build a sugar research institute at Kumarbagh in West Champaran district. The mandate for the institute will be to develop cane strains, which respond well to the Bihar agro-climatic condition.

The earnestness and support extended by the present government in developing the sector augurs well for the state. A specific mention in the list of thrust industries that are going to act as leading sectors for industrial development in Bihar is an ample indicator of the importance attached by the state to this sector.

The other initiatives by the government include,

- Improving the road net work through an intensive programme so that sugar cane becomes available to sugar-mills on time.
- Technical upgradation and expansion of capacity of sugar mills would be encouraged and investment to set up new Sugar units would be invited.
- To encourage setting up of Co-generation plants based on baggasse available in sugar mills.

3.7 THE WAY FORWARD: ADAPTING A MISSION MODE

The North of Bihar is agro-climatically very suitable for producing good quality sugarcane with minimum inputs as compared to other states. This should be used to the best advantage of the state. The intitatives that need to be undertaken are:

- Enabling environment in the State in terms of availability of physical infrastructure- power and road connectivity

- Sugar Cane Research Institute, Pusa or other Sugar Institutions have to work together to develop new varieties of sugar cane to meet the climatic and soil requirements of Bihar. Their research and development must enable the increase the productivity of the sugarcane.
- A large number of existing sugar mills under the state run, Bihar Sugar Corporation had to be closed down due to old and obsolete equipment and inadequate skills, as modernization of the existing plant and equipment and re-training of personnel had not been undertaken by these sugar mills. Capacity of the existing remaining sugar mills is also very low compared to national average. It is understood that in the recent past the State Government has announced investment scheme for expansion of capacity of existing sugar industries, to setup new sugar industry and distilleries. This should make a favourable impact on the growth of the sugar industry in Bihar and the scheme should be implemented in a time bound manner. What we need is to look at the total industry requirement and provision of incentives in the form of rebate in electricity duty / cess preferential tariff for co-generation of power, encouragement for manufacture of ethanol from molasses, waivers on administrative charges on the molasses consumption on distilleries and streamlining the procedure for getting allotment / permits for sale of alcohol in Bihar. This revival of the sugarcane and sugar industry can definitely become a wealth and employment generator for Bihar.
- The present sugar cane production of the state is around 126,000 metric tonnes, out of which 100,000 metric tonnes is being sent to other states. It is, therefore recommended to create sugar co-operatives on the lines of the sugar co-operatives presently available in Maharashtra, and establish at least 10 sugar mills which can fully use the existing production of sugarcane for conversion of sugar.
- There also is a need to enhance the productivity of sugar to at least the level of national average of 70 MT per hectare. This will enable generation of increased income for 2.3 lakh sugarcane farmers. In the second phase we can also consider doubling the area under sugarcane progressively to 4.6 lakh hectares. This system will enable a coherent integration of sugarcane producers in the State and sugar mills leading to higher revenue for farmers. The funding for the new co-operative can come partially as Government grant, equity funds of co-

operative members and bank credit through NABARD. In addition, there is a need to create an institution like Vasantdada Sugar Institute, Pune for carrying out continuous research for improving sugarcane productivity and improving the quality and quantity of sugar yield from sugar mills.[20]

- In situations when production may decline, there will be a need for an appropriate strategy to dispose of excess stocks which has, inter-alia, created storage problem as well. For this, as highlighted in the CACP Sugarcane Report 2003-04, the Government (both the central and the state jointly) would have to formulate a clear plan of action to dispose of excess stocks of sugar lying with mills by carrying out rationalization of sugar release mechanism, increasing utilization of sugar through PDS and other schemes at further subsidized rates and adopting a robust export promotion strategy
- Need to realise the Export Potential: Various concessions granted by the Government such as (a) utilisation of funds for defraying expenditure on internal transport and freight charges to the sugar factories on export of shipments of sugar through SDF (b) subsidy of US $ 8 (Rs.350/-) per tonne on account of shipment of sugar undertaken with effect from February 14, 2003 and (c) the subsidy of Rs.1000/- per tonne granted by the Government of Maharashtra to its sugar factories for encouraging export, have produced the positive result boosting export during the year 2002-03.

It is high time that sugar industry in Bihar is oriented towards export. In that direction, there is a need to have a strong policy support.

Keeping in view the typical international demand and our production structure and operational constraints, the industry must target to capture a sizeable market for export of plantation white sugar. This could be possible only when export is pushed through regularly as a matter of policy.

[20] Source: http://presidentofindia.nic.in/scripts/eventslatest1.jsp?id=1193;

4 FRUITS & VEGETABLES PROCESSING - BETTING ON THE STRONG

Since the agro-climatic conditions of the state are most suitable for the production of fruits and vegetables, there exists a great potential for the growth of these crops on commercial scale. It is more important in the context of globalisation as India has to largely depend on its agricultural export capabilities.

4.1 FRUITS

4.1.1 Overview

Bihar is among the largest producer of fruits and ranks first in Litchi, third in Mango and sixth in Banana production in the country. In case of production of makhana, the state enjoys a monopoly situation. The annual fruit production in the state is 30 lakhs tonnes in an area of nearly 3 lakhs hectares. Overall about 90 per cent of the total production is estimated as marketed surplus. The area and production of major fruits in Bihar for the year 2001-02 is as given below:

Table 4.1: Area and production of major fruits in Bihar- 2001-02[21]

	Area (in %)	Production (in %)
Mango	51.25	43.57
Citrus	6.03	4.55
Guava	9.97	11.28
Litchi	**9.97**	**7.71**
Banana	10.01	18.94
Papaya	0.63	1.15
Pineapple	1.51	3.52
Others	10.63	9.28
Total	**2718000 hectares**	**2877000 MT**

It is estimated that nearly 30 per cent of the major fruit growers are producing litchi followed by 25 per cent in mango and nearly 20-22 per cent as Makhana producers.[22]

[21] Source: http://biada.org.in/destinationbihar.pdf

Analysis of secondary data on production of major fruits in Bihar and the corresponding growth pattern in terms of litchi shows that litchi is one of the fruits that has shown a strong export potential. From negligible amounts of exports in 2001-02 (less than 50 MT) by 2004-05 litchi exports from the state had reached a level of 600 MT. For the last financial year, it is estimated that it had nearly doubled and even crossed 1200 MT. Similarly , in case of litchi pulp, with almost negligible exports in 2001-02, by 2004-05 the state was exporting nearly 450 MT of litchi pulp and for the last year it is estimated that by its exports too had doubled to register a quantum of the order of 900 MT. [23] The same data sources estimate that in the next two years, total litchi exports would rise to 1800 MT in 2006-07 and 2300 MT in 2007-08, of which the litchi pulp exports would comprise nearly 1400 MT in 2006-07 and approximately 1800 MT in 2007-08. The indications are clear. There is strong potential for litchi, both in the current time period and the immediate to near future. Further, at a disaggregated level, the main driver for litchi exports would come from exports of litchi pulp, which would constitute 75-80 per cent of the entire volume of litchi exports from the state. It is therefore, felt that focusing on litchi fruit and also its related processing, would be indeed a strategy that would bet on the strong.

4.1.2 Fruits Processing

Even as the country continues to register significant growth in production of fruits and vegetables,[24] the proportion of production processed commercially has not increased concomitantly. In recent years, though India earned the distinction 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. It is far below the level compared to many developed and developing countries such as Malaysia (83 per cent), Philippines (78 per cent), Brazil (70 per cent) and USA (65 per cent). However, every year 25-30 per cent of

[22] Sinha, S.P., "A study on Dynamics of Marketing of Selected Fruits in Bihar", Bihar Institute of Economic Studies, Patna

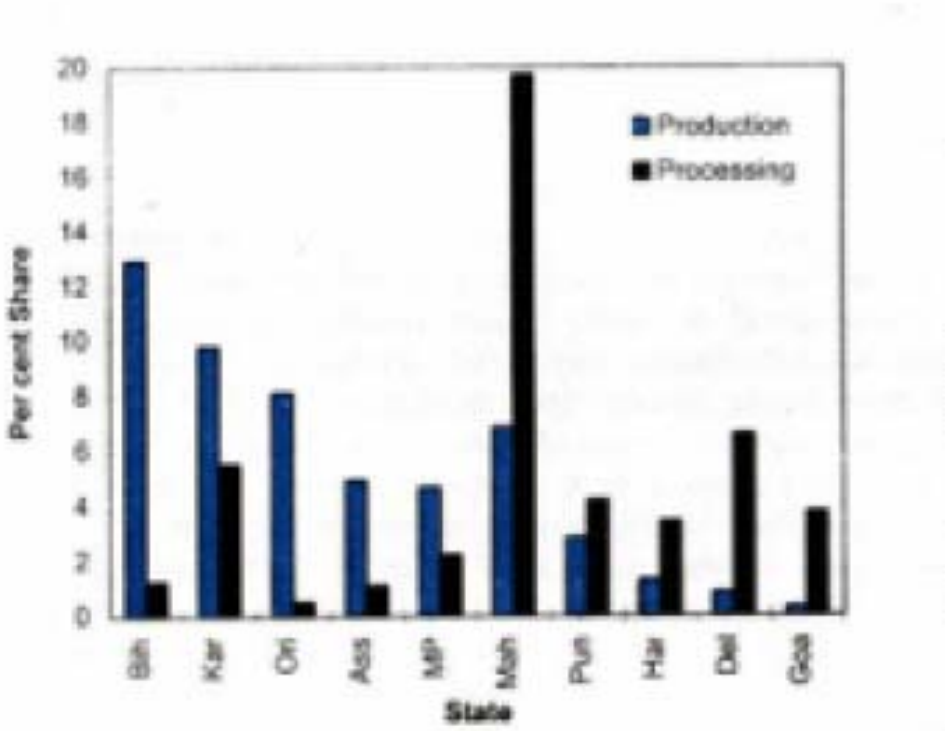
[23] Source: http://biada.org.in/destinationbihar.pdf

[24] Roy, B.C (1997-98), Growth and Prospects of Fruits and Vegetable Processing Industry in India, NCAP, New Delhi

the total produce goes waste due to inadequate post-harvest technology, poor infrastructure, as well as absence of linkages between processing industry and the growers.

Analysis of secondary data also reveals considerable inter-state variation in terms of distribution of processing units and levels of infrastructural development. It was found that processing units are mainly concentrated in the states with better infrastructural facilities rather than in states that have the availability of raw materials. Bihar, which contributes 12.97 per cent of total production accounts for only 1.28 per cent of processing units. The same pattern is observed for Orissa, Madhya Pradesh, Karnataka and North-Eastern states. On the other hand, Maharashtra, Rajasthan, Punjab, Haryana, TamilNadu, Himachal Pradesh, Uttar Pradesh, Goa, Delhi and Chandigarh have a lower share in production in comparison to their share in total processing units in the country[25].

Figure. 4.1: Share in production and processing of fruits and vegetables by states



[25] Roy, B.C., NCAP, 1997-98

In the context of the potential as observed at the aggregate level, it emerges that there is need for modernising the existing processing units and developing basic infrastructure that have hitherto received little attention. There is also a need to encourage contract farming in order to overcome the problem of quality raw material supply faced by the industry. Further, policy makers should provide appropriate incentives to the cooperative and corporate sectors and assure a policy environment conducive to the establishment of fruit and vegetable processing units in potentially productive areas.

4.1.3 Litchi Marketing Scenario

The process of marketing of fruits in general, passes through four hands, before it reaches the final consumers. Along the supply chain, the incremental cost in India is estimated to be nearly 30 per cent at the farmer's level, followed by a maximum of 35 per cent at the level of the trader, 14.7 per cent at the wholesaler's level and finally an incremental cost of 21.6 per cent at the retailer's level. A straightforward approach to reduce this would be to reduce the level of intermediation between the farmer and the final consumers, thereby increasing the profit margins for the real producers and also an extension in demand for fruits.

Table 4.2: Percentage distribution of incremental costs of production along the supply chain[26]

Farmer	28.4
Trader	35.3
Wholesaler	14.7
Retailer	21.6
	100.0

In terms of marketing of fruits, there has been some development resulting from improvement in roads, markets and transport. Still, marketing of fruits in Bihar is not able to match up with the demand. Some of the major constraints are:

- Large number of intermediaries between the producer and the final consumer, ranging from village merchants, small commission agents and dealers in villages,

[26] Source: http://agricoop.nic.in/Kharif2006/Kharif2006ppt/J.S.Marketing.ppt Derived from Presentation on marketing and enhancing competitiveness, February 22, 2006

weekly haats / primary markets or in wholesale, secondary urban market centres, terminal market and the retailers.

- There are several marketing agencies for the marketing of different fruits, ranging from pre-harvest contractors to wholesalers, and commission agents. Contract sale helps the producers to avoid the risk.[27] The most common channel consists of producer-pre-harvest contractor-wholesaler/commission agents-retailer-consumer.[28]
- Poor financial condition, higher marketing cost & lack of packaging facility followed by shortage of labour of both nature i.e. skill and unskilled during the peak marketing season.
- Unavailability of cold storage and lack of knowledge of proper marketing.

4.1.4 Needs

- Awareness building programmes for proper marketing systems are required for the producers, particularly for marginal and small producers.
- Reducing wastages – More than 82 per cent of the total production of Litchi is estimated as marketable and marketed surplus. About 13.7 per cent was accounted as its wastage followed by nearly 3 per cent as wages paid and little less than 3 per cent were consumed by growers. Wastages are relatively high among medium and small producers compared to the marginal producers.[29]
- Increasing the share of producers in the total price, through reduction in the intermediaries. [30]

[27] In the case of Banana, direct sale channel i.e. producers-wholesalers/commission agents-retailers-consumers is the most popular. Regarding Makhana, bulk of it was sold directly either to wholesalers or retailers. Wholesalers themselves purchased the Makhana directly from growers, bearing various charges of marketing.

[28] This is the most preferred channel in operation for marketing of mango and litchi in Bihar.

[29] Sinha, S P , " A Study on Dynamics of Marketing of Selected Fruits in Bihar", Bihar Institute of Economic Studies, Patna

[30] Shares of producers are less than 50 per cent of the consumer price in most of the marketing channels of different fruits. With the elimination of one intermediary in the market channel on an average the producer share increased by more than 5 per cent of the consumer's price.

- Setting up of institutional agency such as producers co-operative, that can be vested with the responsibility of the various marketing functions.
- Use of ICTs for direct access to market, setting up of info kiosks (drawing upon the models developed by ITC and Drishtee).
- Market oriented quality production requires investment at both pre and post harvest level.
- Credit linkages are essential for the growth of economy by way of expanding the infrastructural facilities for transport, storage and processing of the produce.
- The fruit sector in Bihar requires big investment either by the public or private sector alone or though public-private partnership (PPP).

Box 4.1: Makhana – intensifying the white ball revolution

Bihar produces nearly 90 per cent of global production of Makhana. Some of the key districts that need to be focused on, while deciding on intensifying the growth of makahna in Bihar are: Darbhanga, Madhubani, Saharsa, Supaul, Purnea, Katihar and Araria – essentially the north-eastern part of the state. The high level of demand for this product, both in the domestic and international markets draws from its nutritive value and the presence of 14 per cent protein, 76 per cent carbohydrate, minerals, vitamins and negligible quantity of fat.

Discussions at the February 2006 Consultation suggested that the intensification of the white ball revolution calls for a three tier integration comprising backward linkages, product development (diversification into new products) and strategic marketing.

The Makhana Parivar Kendra is already working on providing solutions to the agronomic problems, procurement of makhana from the farmers at fixed price (based on a differential price grading) and linking the farmers with the banks to get credit support. This needs to be further strengthened by announcing the price for different grades at the beginning of the cropping season (in order to avoid any disincentive from the farmer's side in case his product is graded at a lower level and thereby he restrains from joining the production in the following production cycle). An external certification agency should therefore grade the products/crops at the farm level in the early parts of the season, i.e. much before the harvest time. Secondly, in order to provide easy access to credit, small farmers may group themselves into a co-operative and then approach the banks for obtaining credit.

As regards the issue of efficiency in marketing(i.e. reducing wastages), the use of ICT (models developed by ITC e-choupal and Drishtee) could be effectively utilised for reaching out wider markets, both within the country and beyond. Donor agencies (such as the UNDP) and national and international development agencies working in the area of web-based marketing of agri-products could be approached for setting up marketing linkages for the makhana producers.

Even though makhana has a high marketable surplus, and home consumption is in the order of less than 2 per cent of total production, wastage is estimated to be in the order of 4 per cent and about 3.55 per cent of total production was paid as wages and others.[31]

[31] Source: http://agmarknet.nic.in/resproj3.htm

4.2 VEGETABLES

Vegetable production is generally taken up to support income from major crops. Such diversification is mainly a characteristic of small farm households. It is , therefore, natural that income from vegetable is higher in small farm size groups than the large farm size group. In fact, there are studies that indicate that gross annual income per hectare of vegetable crop land is highest in case of marginal farms. There is no wide practice of double cropping of vegetables in Bihar

4.2.1 Production

In terms of production of vegetable crops, potato occupies the largest proportion followed by brinjal. The productive efficiency of vegetable cultivation on small and tiny plots is a classic case of the issues that have been debated in the agrarian literature on farm size vs. productivity. The fact that marginal farmers go for intensive cultivation with their own human labour capital which give them higher yield of their vegetables, does not deny the fact that no incentive mechanisms are required for this group of vegetable growers. Moreover, at the aggregate level, for all the farm size groups, the productivity is below from the expected yields.

Table 4.3: Area and production of major vegetables in Bihar- 2001-02[32]

	Area (in %)	**Production (in %)**
Brinjal	9.60	14.64
Cabbage	6.06	1.72
Cauliflower	10.23	12.48
Okra	9.92	11.33
Peas	0.45	0.24
Tomato	8.12	9.89
Onion	2.57	1.77
Potato	24.32	18.87
Sweet Potato	0.86	1.00
Others	27.86	28.05
Total	**578900 hectares**	**7591600 MT**

[32] Source: http://biada.org.in/destinationbihar.pdf

In case of vegetables production human labour forms the major component of operational costs which have fewer variations across different categories of farmers. An analysis of costs and net returns from the cultivation of vegetables with the help of the estimation of gross and net returns over costs of production and output-input ratio, suggests that farmers earned remunerative returns particularly over paid-out cost and that yield rate has significant bearing on net returns of vegetables production. As such, large variations may be found due to variations in yield rate among different categories of farmers. There are also variations in output-input ratio, which is the most important indicator of judging the efficiency of cultivation of vegetables. The returns obtained from input used are found to be on the lower side in case of ladyfinger, rendering it less profitable compared to other vegetables. It is also found that tomato is the most remunerative crop followed by brinjal, potato, cauliflower and cabbage stand thereafter. However, despite the variability in net returns because of variations in yield rate all the selected vegetables mentioned above are profitable and highly labour intensive. As such, vegetable crops have vast potential of generating employment and income opportunities in the State.[33]

4.2.2 Marketing of Vegetables

Marketing system of vegetables varies considerably from farmer to farmer depending upon the nature of the vegetables and their capacity. Marketing of vegetables changes hands three to four times between producers and consumers. It means that the multiple intermediaries exist in the marketing system of vegetables.

There is predominance of sales in primary / rural market (haat). Sale at the village level in case of large farmers is less than small category of farmers. This is found as a common pattern in case of all major vegetables. Interestingly, in most of the districts vegetables are not being sold in the agricultural market yard. This clearly indicates that the marketing of vegetables has not been brought under purview of the regulation of agricultural marketing system in the State of Bihar. The rural primary markets where substantial proportions of vegetables are sold are not developed from the market infrastructure point of view. The regulatory measures are also not enforced. Rather,

33 Prasad, J , Production and Marketing of Vegetables in Bihar, ANSISS, Patna

there is complete control of private intermediaries over the operation of trade in these rural oriented markets. As such, transaction of vegetables is being made by a chain of intermediaries namely, katcha arhatiya, broker, agent of the wholesaler / commission agent, wholesaler / commission agent and retailers

It is thus found that the sales at low prices, little grading at the village level, tie-in-sales, presence of large chain of intermediaries and high marketing costs and margins – all these tendencies seem to persist across the regions in the State. Production system is also not encouraging as there has been low productivity of vegetables due to low adoption of scientific cultivation of vegetables.

4.2.3 Needs

- Improve the vegetables marketing system by bringing out the enforcement of regulatory measures along with creation of market infrastructure facilities such as transportation, storage.
- Post-harvest management for increasing marketing efficiency. Grading and packaging need special attention in this regard.
- Efficient vegetable co-operatives with credit and marketing linkages. Restricting membership at the primary level (depending upon relative proportion of number of marginal and small producers and the volume of output) in certain areas may be considered. These societies may be organisationally and functionally structured as a agribusiness consortium which will take care of both production and marketing through giving institutional strength to backward and forward linkages

5 CONCLUSIONS- ACTION POINTS

Inducement to invest is limited by the size of the market. This has however not been the only reason for low levels of investments in Bihar so far. Supply side factors, ranging from access to major raw materials, financial resources (including subsidised credit) and also lack of supporting infrastructure to cater to the existing demand have been few of the critical factors that have restrained the economy from moving on to a high growth trajectory. Issues of governance too had their share towards the low growth registered in Bihar during the last decade and a half.

Efforts have been made at various fora to identify the critical success factors that would catapult the state's economy to a moderate and high growth situation. It is encouraging to note that the state government has already taken steps towards laying the foundations for industrial growth (the Industrial Policy, 2006). The exercise carried out by Deshkal and FES to identify the opportunities and enablers for growth has once again emphasised that select agro-based sectors hold the promise for becoming the "growth engines". The potential, constraints and the specific way forward have been detailed in the previous sections. The action points specifically, across all the sectors can be summarised as:

1. Undertake detailed value chain analysis
    a. Analysis of constraints
    b. Calculating the costs of incremental value addition and returns on investment at various levels.
    c. Strengthening value addition

2. Policy level initiatives
    a. Availability of infrastructure
    b. Providing tax incentives for R&D, innovation and standardisation
    c. Creating investor friendly climate
    d. Incentives for optimum utilisation of existing capacity and capacity expansion
    e. Incentives for diversification
    f. Encourage PPP

3. Marketing
    a. Creating institutional mechanism that support procurement, market linkages – forward and backward
    b. Market research study on demand supply dynamics

4. Certification
    a. Standardisation of procedures- grading, packaging
    b. Certification of processing units
    c. Quality testing laboratories

5. Industry academia linkages

6. Consolidation and focus for cooperatives
    a. Sharing single need of all the farmers or all the needs of discrete groups

7. Creating a regulatory mechanism
    a. Price regulatory mechanism
    b. Structured Trading
8. Availability of information technology infrastructure that can provide direct institutional and retail market linkages , exposure to new markets, information about prices, best practices adopted in the value chain etc. Experiences from success stories of rural information kiosks, ITC e-choupal initiative and Dristee India can be drawn.

9. Enabling environment for skill enhancement and retention of skilled personnel
    a. Supply chain management
    b. R&D

While the above agenda points are holistic, they can be made sector specific and can be represented in the form of matrix as given below:

Table 5.1: Sector specific parameters for action

Parameters for action	Dairying	Sugarcane	Fruits and Vegetables
Productivity	Product innovation for enhancing the strength of the investment multiplier in the sector	Realising the potential that can be created through diversification and enhancing the strength of the investment multiplier in the sector	Improving pulp content of litchi (as litchi to be the main growth driver) Providing agronomic solutions Reducing wastage
	Improvements in breeding for yield increases	Developing new varieties of sugar cane to increase area under cultivation and meet the climatic and soil requirements of Bihar.	Increase productivity across all farms growing vegetables Adopting better agronomic and scientific processes for improving yield rates and reducing variability of net returns across vegetables
Infrastructure	Cooling technology		Improve litchi processing facilities PPP for attracting investments
	Establish bulk coolers	Creating irrigation and flood management system	Promote use of ICTs for enhancing access to markets and remunerative prices

Parameters for action	**Dairying**	**Sugarcane**	**Fruits and Vegetables**
	More even spread of chilling and dirty plants, with focus on north and north-eastern parts of the state. Adequate incentives to be showcased for potential investors	Even distribution of sugar mills across the state and setting up of allied industries. Provision of incentives in the form of rebate in electricity duty / cess preferential tariff for co-generation of power, encouragement for manufacture of ethanol from molasses, waivers on administrative charges on the molasses consumption on distilleries and streamlining the procedure for getting allotment / permits for sale of alcohol in State	
	Focus on assured supply of power for the chilling and transportation	Focus on assured supply of power	
	Improve quality of roads to carry milk & milk produce to chilling and marketing hubs	Improve quality of roads in order to reduce time taken to transfer sugarcane to factories and thereby improving recovery of sugar	
Institutional	Expand membership of dairy cooperatives. Initially bring at least 1 lakh new members under the cooperative umbrella	Create more sugar cooperatives and enabling institutional mechanism, taking cue from Maharashtra.	Encourage contract farming to overcome problems of quality raw material supply faced by the industry Ensure certification

Parameters for action	Dairying	Sugarcane	Fruits and Vegetables
	Institutionalise the process of organised sales/procurement to cater to urban demand, arrest excess supply situations and possibility of decline in production in successive time periods	Formulating a clear plan of action to dispose of excess stocks of sugar lying with mills by carrying out rationalization of sugar release mechanism, increasing utilization of sugar through PDS and other schemes at further subsidized rates	Appropriate incentives required for cooperatives and corporate sectors for setting up fruits and vegetables processing units in the state
	Testing labs and certification agencies required for quality testing and expanding the market base	Testing labs and certification agencies required for quality testing and expanding the market base	Promote formation of producers' cooperative for better marketing linkages
	Convert few technology development and training institutions as centres of excellence to enable availability of trained technical manpower	Convert few technology development and training institutions as centres of excellence to enable availability of trained technical manpower	Reduce the number of intermediaries in marketing of fruits and vegetables
		Realising the export potential and adopting a robust export promotion strategy	Promoting better credit linkages at all stages of value addition
		Create institutional mechanisms that enables availability of credit at competitive rates	Awareness building programmes required for small and marginal growers on how to access wider markets and get remunerative prices

Parameters for action	**Dairying**	**Sugarcane**	**Fruits and Vegetables**
		Create institutional mechanism that facilitates structures trading and thereby provides level playing field Create institutional mechanism for price regulation especially in procurement of cane	Promote post harvest management for increasing marketing efficiency
Research	Conduct detailed study on value chain from the milk producers to the final consumer level. Examine the scope of margins for stakeholders across the value chain – input these into designing programmes and actions.	Conduct detailed study on value chain from the farmer to the final consumer level. Examine the scope of margins for stakeholders across the value chain – input these into designing programmes and actions.	Detailed study for understanding the value chain, the credit needs fo stakeholders at each stage of value addition, the cost of certification and how it would affect the final consumer price, examining concomitant institutional incentives to reduce the adverse impacts of any certification process, scope of PPP in production, processing and marketing of fruits and vegetables

ANNEXURES

Table 1: Estimates of milk production -1997-98 to 2003-04- Statewise (000 tonnes)

S.No.	States/UTs	1997-98	1998-99	1999-2000	2000-01	2001-02	2002-03	2003-04
1.	Andhra Pradesh	4473	4842	5121	5521	5814	6584	6959
2.	Assam	719	725	667	683	682	705	727
3.	**Bihar**	**3420**	**3440**	**3454**	**2489**	**2664**	**2869**	**3180**
4.	Gujarat	4913	5059	5269	5312	5862	6089	6421
5.	Haryana	4373	4527	4679	4850	4978	5124	5221
6.	Himachal Pradesh	714	724	742	761	756	773	786
7.	Jammu & Kashmir	1167	1232	1286	1321	1360	1389	1414
8.	Karnataka	3970	4231	4471	4599	4797	4539	3857
9.	Kerala	2343	2420	2532	2605	2718	2419	2111
10.	Madhya Pradesh	5377	5442	5519	4761	5283	5343	5388
11.	Maharashtra	5193	5609	5707	5849	6094	6238	6379
12.	Orissa	672	733	850	876	929	941	997
13.	Punjab	7165	7394	7706	7777	7932	8173	8391
14.	Rajasthan	6487	6923	7280	7455	7758	7789	8054
15.	Tamil Nadu	4061	4273	4586	4910	4988	4622	4752
16.	Uttar Pradesh	12934	13618	14152	13857	14648	15288	15943
17.	West Bengal	3415	3441	3465	3471	3515	3600	3686
18.	Delhi	267	290	290	291	294	296	299
19.	Chhattisgarh	-	-	-	777	795	804	812
20.	Uttaranchal	-	-	-	1025	1066	1079	1188
21.	Jharkhand	-	-	-	910	940	952	954
	All India	**72128**	**75424**	**78286**	**80607**	**84406**	**86159**	**88082**

Source : Department of Animal Husbandry

Table 2: Statewise annual installed production capacity of sugarcane (in lakh tonnes)

S.No.	States	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02
1	Andhra Pradesh	7.49	8.34	8.59	8.836	8.836	8.836
2	**Bihar**	**4.01**	**4.27**	**4.36**	**4.733**	**4.733**	**4.733**
3	Gujarat	8.96	9.60	9.60	10.707	10.707	10.707
4	Haryana	4.27	4.27	4.27	4.266	4.582	5.181
5	Karnataka	8.37	8.93	10.15	10.825	11.33	12.306
6	Madhya Pradesh	0.99	0.99	0.99	1.09	1.545	1.545
7	Maharashtra	43.00	45.86	49.12	52.42	55.862	61.697
8	Punjab	6.25	6.25	6.25	6.59	6.598	6.842
9	Tamil Nadu	12.72	13.12	13.51	14.849	14.849	15.242
10	Uttar Pradesh	36.39	38.98	41.89	45.32	47.015	43.495
11	Others	2.14	2.14	2.15	1.911	2.14	6.367
	Total	**134.59**	**142.75**	**150.88**	**161.81**	**168.202**	**176.951**

Source: Maharashtra State Cooperative Sugar Factories Federation Ltd

Table 3: Sugar production in Bihar

Year	Area (000 ha)	Production (000 t)	Yield (t/ha)	Cane Crushed (000 t)	Sugar production (000 t)	Sugar factories	Average crushing duration (days)	Recovery (%)
1950-51	166	4360	26.27	2229	229	27	97	10.26
1960-61	185	7038	38.04	4177	385	28	156	9.22
1970-71	162	6209	38.33	3249	292	25	116	9.01
1980-81	111	3480	31.35	2115	194	28	68	9.17
1990-91	149	7805	52.38	4576	415	25	115	9.07
2000-01	94	3988	42.43	3161	288	10	103	9.11
2001-02	114	5211	45.71	3898	342	10	116	8.78
2002-03	187	4601	24.60	4537	408	10	125	9
2003-04	103	4222	40.99	2932	274	10	81	9.33

Source: Indian Institute of Sugarcane Research

Table 4: Proposed sugarcane network

Probable Districts	Crushing capacity of existing mills (TCD)	Crushing capacity of closed mills after expansion (TCD)	Crushing capacity of new mills(TCD)	Capacity expansion (TCD)	Total capacity(TCD)	Total no of closed mills	Total no of working mills	Area under sugarcane (hectare)
Bhagalpur*	0	0	5000	0	5000	0	0	5795
Nalanda	0	0	5000	0	5000	0	0	162
Araiya*	0	0	5000	0	5000	0	0	309
Supaul	0	0	5000	0	5000	0	0	553
Bhojpur*	0	0	5000	0	5000	0	0	3206
Rohtas	0	0	5000	0	5000	0	0	430
Madhubani*	0	10000	5000	0	15000	2	0	4382
Darbhanga*	0	0	5000	5000	0	1	0	1160
Muzaffarpur*	0	0	5000	5000	0	1	0	4655
East Champaran	3500	0	10000	5000	1500	2	1	12900
West Champaran*	19500	0	10000	5000	800	2	4	104675
Begusarai*	0	0	5000	5000	0	0	0	4612
Madhepura	0	0	5000	5000	0	0	0	5541
Jamui	0	10000	5000	5000	0	0	0	2150

Source: Data presented at Deshkal- FES Consultations held at Patna, February 2006

Table 5: Litchi production scenario

States/UTs	Area(000, ha)				Production(000, tones)				Productivity(tones/ha)			
Year	**95-96**	**96-97**	**97-98**	**98-99**	**95-96**	**96-97**	**97-98**	**98-99**	**95-96**	**96-97**	**97-98**	**98-99**
Assam	4.5	4.1	4.1	4.0		17.6	18.3	16.8	6.5	4.3	4.5	4.2
Bihar	**14.7**	**23.5**	**29.5**	**25.8**	**146.9**	**282.4**	**354.3**	**309.6**	**10.0**	**12.0**	**12.0**	**12.0**
Orissa		2.1	2.3	3.2		7.3	7.4	8.6		3.5	3.2	2.7
Punjab	1.1	2.2	2.2	2.3	6.0	13.0	13.0	13.2	5.5	5.9	5.9	5.7
Tripura	1.5	3.5	3.5	4.7	5.3	22.1	22.	26.6	3.5	6.3	6.3	5.7
UP Hills		8.7	8.8	8.8		13.2	16.0	13.7		1.5	1.8	1.6
W Bengal	3.1	3.4	3.4	3.7	15.5	17.9	19.1	36.0	5.0	5.3	5.6	9.7
Others	5.0	3.7	4.0	3.7		4.1	4.5	4.4				
Total	29.9	51.2	57.8	56.2	202.8	377.6	454.7	428.9	6.8	7.4	7.9	7.9

Source: Data presented at Deshkal- FES Consultations held at Patna, February 2006