CHAPTER-VIII

SUGGESTIONS

8.1. Introduction

India is today the second largest producer of food in the world and has all the potential of becoming number one if the emerging problems after the green, white and blue revolution are properly addressed. Agriculture production has shown a growth of about three per cent per annum, and today, India is the number one producer of milk, and second largest producer of fruits and vegetables in the world, with a buffer stock of over 60 million tonnes of wheat and rice. Due to poor handling of the produce, post-harvest losses have been high, resulting in a significant gap between gross production and the net availability to the consumer. The profits on agricultural commodities have greatly diminished. Since nineties, the cost of agricultural inputs has increased faster than the market price of the outputs. As a result, farmers are about 15-20 per cent worse off, even after taking into account the gains in productivity.

The problem of improvement in agriculture needs to be tackled from two different angles, first, to increase productivity of agriculture and delivery system and second, to increase the farmer’s earning through efficient and effective value addition. Value addition to raw food material in India is only 7 per cent while it is 23, 45 and 188 per cent in China, Philippines and UK, respectively (as per National Food Processing Policy, Draft Document, 2000). We process less than 2 per cent of fruits and vegetables as compared to 30 per cent in Thailand and 80 per cent in Malaysia (PIS Feature, 2001).

The new approach of value addition through the consumer’s mind needs special attention. All the activities now must be seen from the consumer point of view. Keeping this approach in mind, there are three ways in which value addition to farm produce is possible:

**Level 1** - Post-harvest level/primary processing: proper cleaning, grading and packaging e.g. vegetables, potatoes, fruits, etc.

**Level 2** - Secondary processing: basic processing, packaging and branding e.g. packed atta, suji, rice, etc.

**Level 3** - High end processing: supply chain management, modem processing technology, packaging of processed foods, branding, marketing e.g. potato chips, breakfast food, noodles, etc.

8.2. Need for a Change

Time has come when agriculture has to be run as agribusiness rather than subsistence agriculture. The concepts of profit and loss are getting extended to the farms. Profits have to be achieved through judicious selection and application of inputs, higher productivity and improved quality.
Creation of a food chain starting from the farm gate to retail outlets is inevitable. In fact, the chain should start from agricultural research institutions and laboratories to help farmers in scientific cultivation, particularly to produce quality raw material for specific end product, proper post-harvest management, storage, transportation and marketing. There is also need for application of more and more mechanisation and automation in post-harvest management and processing operations; utilisation of wastes generated during processing; agro-industrial systems development; and bio-process technology for conversion of raw agricultural produce to useful products.

8.3. Suggestions

After critical analysis of the gathered data, certain findings were deduced as mentioned in Chapter VII. Following are some of the suggestions in correspondence with these findings.

8.3.1. General

1. The agro processing units under study severely face the problem of availability of quality raw material of respective product. This problem can be resolved through diversifying the raw material input. Agriculture must diversify in favour of high-value enterprises to meet the emerging challenges. The emphasis should be on production of high value commodities e.g., fruits, vegetables and grains with enhanced quality and specific nutritional and processing characteristics.

2. Agriculture produces do not receive their desirable prices because of absence of standardized quality evaluation procedure as experienced by 80% respondents. The pricing policies need to be changed, linking it with the quality of the product as the basis for fixing per unit price, just as fat content in milk; higher protein quality/quantity in wheat; better aroma or cooking quality in rice and shelf life of fruits and vegetables.

3. Since marketing of products is more remunerative than raw commodities, farmer processor linkages are needed to add value as per demands of the consumers. There is a great scope of developing some of our traditional agro processed items from spices, fruits, milk, grains, cotton and wood. Appropriate and cost-effective packaging technology is needed to be developed for ensuring safety and prolonged shelf life.

4. At the rural level, in this district, the agro process industries have lower net profit to capital ratio. This is indicative of the low level of efficiency of these agro industries. It necessitates the importance of absorbing more efficient technologies in agro process industries.

5. Agriculture is fast becoming demand driven from the earlier supply driven situation. Farmers in this district have to grow specific varieties needed for processing or adding value to their produce. Policy and legislation must be reformed to allow processors to purchase their produce requirement directly from the farmers. In addition, they are to be motivated for establishing their
own processing units, may be of smaller capacities to control wastages and post harvest losses.

6. Market related problems faced by agro processors in Sangli District, can be diluted by establishing supply chain linkages between farmers, processors and market network on a mutually beneficial contractual agreement.

7. It has been disclosed in this area that, backward production linkage of agro process industry is much stronger than its forward production linkage. The whole of agricultural production takes place in rural areas but the rural agro process industry is largely involved in secondary processing. Therefore, the output of rural level agro process industries is more constrained by marketing since a smaller proportion of their output gets used as input in other manufacturing activities. This marketing problem has led to widespread prevalence of business service activities particularly among the smallest size group individual ownership units. This phenomenon is leading to a vicious circle of low productivity, low earnings and low level of technology. Marketing infrastructure needs to be urgently provided to them in the form of rural mandies, marketing cooperatives, larger purchases by governments, strengthening linkage with larger sized enterprises etc.

8. The network of self-help groups is very strong in Sangli District. Agro process industries can take the help of these common interest groups to strengthen the bargaining power. This will ensure appropriate prices to the end products.

9. There is considerable volume of unskilled labour pool in this area. The rural labour can be involved in industrial activity by providing them alternative work at their doorstep. This is possible by incorporating suitable modifications, for primary processing of the agricultural produce at rural units and effectively linked to urban units for secondary processing, product development and marketing. This step will be useful for sustainable rural development in Sangli District.

10. Majority of agro processing units in Sangli District are facing location disadvantages. There is need to restructure the policy so that agro processing units could be strategically installed, depending on the raw material availability, labour, product utilisation and domestic and/or export marketing. It should be nurtured to evolve on a natural course after initial nucleation into food parks and agro export zones.

11. Many industries in this area are not aware about available indigenous technologies. There is an urgent need to have a scientific database of these technologies so that they can be compared with other imported technologies. There are nearly 200 major indigenous technologies for agro processing which have been listed by National Bank for Agriculture and Rural Development (NABARD) and other institutions.

12. There is an urgent need to have commodity-based management systems to advise the governments, Research & Development
13. Institutions, farmers and processors to take steps proactively, based on continuous tracking of the demand, supply, consumer needs and prices both in domestic and international markets. The intelligent information system should be networked with all user agencies and farmers in the district, using latest IT technologies and infrastructure.

14. Processing of agricultural raw material in this district generates a sizable amount of utilizable byproducts, commonly called as ‘waste’. They can be converted into usable co-products. There is need to develop commercially viable technologies to re-utilize the agro processed waste. These ventures would be a success if main product manufacturing is undertaken in harmony with the by-product processing. Government regulations and policies must be amended suitably for this purpose.

15. In spite of the initiation of several government programmes, lack of infrastructural facilities hinders the growth of agro process industries in all the ten talukas of Sangli District. These obstacles are related with electricity connection, power cut, availability of raw materials, transportation, etc. Infrastructural facilities need to be upgraded substantially for economic viability of these enterprises.

16. The problem of seasonality of both small and large size enterprises in food and non-food product industries restricts efficient use of processing facilities in Sangli District. It needs to be tackled by making these enterprises suitable for processing multiple agro products over different seasons.

8.3. 2. Commodity-based Suggestions

A) Grains, Bakery Products and Spices

1. The difficulties related to quality dimension of food produces are pointed out by majority of agro processing units. It is the fact that, the varieties of grains grown now have been developed primarily for increased yield and lack the quality characters. Research & Development programmes should focus on developing varieties for specific end-use and processing qualities.

2. The varieties grown at present are more suited for making some traditional agro items. The technologies for making these products are available with agriculture universities and laboratories of Council of Scientific and Industrial research (CSIR) and Indian Council of Agricultural Research (ICAR). Their marketing potential should be explored and efforts should be made to make these items commercially more viable.

3. Processing units should be linked to areas/zones that should grow specific varieties for specific products. Contract/Contact farming can link this end. Respective laws must be amended by making provisions to provide economic incentives, so that farmers can be encouraged to produce quality grain.
4. Current post-harvest practices for handling of grains result in high losses and leads to deterioration of quality. Storage and handling technologies and infrastructure should be designed in a manner that losses are minimized and the produce retains its original quality. Post-harvest care involving grading, storage and preservation of the produce should meet the needs of export market. Agro processors can form their groups to design suitable action plan to establish facilities like scientific storage to control post harvest losses.

5. Comprehensive processing units for developing products as well as by-products should be set up. For example, wheat flour mills can earn added benefits by undertaking wheat germ and oil production in consonance. Rice processing units should simultaneously handle de-husking and processing of bran for food, feed, oil and biochemical.

6. Separate agency for grain should be established which should focus on all the activities from R&D to the production centres for quality grain, and from post harvest handling to processing and marketing including image building in the markets. This agency would work for strategy formulation to develop infrastructure that can be facilitated to micro-level farmers and agro processors.

B) Horticulture (Fruits and Vegetables)

1. R&D programmes should focus on end-use of the produce, both for market and the needs associated with processing.

2. Fruit pulp units should be readjusted in the form of clusters, and should ensure packing under world class conditions. Processing units to make useful co-products like oil from kernels and peel of fruits should be set up alongside the pulp making units.

3. Suitable awareness programs are required to be arranged for agro product processors in this district so that they can know about protocols for making traditional fruit and vegetable products under hygienic conditions. This will encourage to produce quality products.

4. Peel, pulp and seed from different fruits are invariably discarded as ‘waste’. These can be converted into valuable co-products. Technologies for production of oil, natural colour, fibre, and protein, have been developed. Concerned producers in this district are required to be encouraged for installing these technologies as viable option.

C) Milk and Dairy Products

1. Some of the traditional products from milk processing require R&D support for processing and packaging. This could enrich commercial viability of milk processing units in this district to acquire broader markets.

2. Attention must be paid to develop nutritive foods using processed milk for example; whey which is rich in protein can be supplemented with
nutraceuticals, followed by gelling and suitably packaging to enhance its shelf life.

3. There is an urgent need to develop low cost technologies for mechanisation to hermetically pack milk products as per needs of end users and involving the manufacturers of packaging material and equipment in an integrated manner.

8.3.3. Public Policies

1. Policy and legislation must be amended to enable the processors to procure grains like wheat and rice directly from the farmers. This will be cost saving and also ensure the authenticity and traceability of material.

2. Policy reforms should be made so that cooperative units in agro processing sector can work as competitive units, self-supporting on their own strength. State government should act as a facilitator of cooperatives. These should be self managed units, with appropriately defined independent dispute-handling mechanism.

3. Multiple taxation on value-added products restricts development. There is need to simplify the taxation laws at the earliest.

4. Special laboratories must be established in public and private sector for export certification of agro produce consignments.

5. There should be time-bound commitment from the central and state governments to develop much needed infrastructure like cold storages, warehouses, sorting, grading and packing at the farm level. Proper incentives should be provided for these ventures.

6. The rural level agro process industry does not come within the purview of any single Ministry. Consequently, it comes under the purview of multiple registration authorities. Because of this problem, only a fraction of these industries are registered. It is required to bring agro process industries under single registration authority and start a massive campaign to register them for infusing technology and credit.

8.3.4. Banking Support

1. Technology generating institutions must help in developing the techno-economic project profiles, leading to feasible proposals for the prospective entrepreneurs.

2. Self-help women groups have successfully taken up some part time activities with support from NABARD and other institutions. These groups should be assisted in making traditional foods, with proper training and financial back up.
3. Simplified credit facility should be provided to farmers and their cooperatives those wish to undertake value addition to their produce. Loss risk cover should be provided to these farmer-entrepreneurs.

4. The access to credit is very low in the case of agro process industries. Even the role of organized financial institutions has been virtually negligible in terms of coverage. More than half of agro process industries access credit still from informal sources in this district. There is need to enhance banking support to these industries on more viable terms and conditions.

5. It is clear that the access to credit particularly from the organized financial institutions has constrained agro process industry to invest in fixed capital and new technologies and thus expand viably. The vicious circle of low credit - low surplus - high dependence on putting out system - low level of manufacturing activities needs to be broken by large-scale infusion of credit from the formal sector.

8.3.5. Management Models

1. Processing units, adding value to agricultural produce, should lay emphasis on developing effective backward linkages with farmers, to procure quality raw material.

2. Contract farming should be promoted in a manner that processing firms are not able to exploit an unequal relationship with growers.

3. Small cooperative processing units should be promoted in Sangli District. These could undertake primary processing, grading and cleaning of produce for adding value.

4. Rural processing and value-addition groups should be promoted. This will allow small and marginal farmers to be part-time farmers and work in rural enterprises for enhanced income and returns on their produce.

8.4. The Nine-D Model

After scrutinizing hurdles in front of the agro processing industries, following model has been evolved. It is named as “Nine-D Model”, it has been developed to suit requirements of the promising sectors of economy. It is based on the concept of Business Process Reengineering (BPR). BPR is a flexible methodology that ensures utilization of existing resources in different and modified ways. There is no single ‘right’ way to implement business process reengineering. The suggested Nine-D Model as shown in figure 8.1, comprises of four phases, namely,

(1) Planning
(2) Designing
(3) Executing
(4) Monitoring
8.4.1. Phases of Nine-D Model

Each phase contains major steps which provide direction towards making the efforts of reengineering more effective. The four phases and their major steps are mentioned in table 8.1.
Table 8.1
Phases and Steps in the Nine-D Model

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Phase</th>
<th>Step</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Plan</td>
<td>1. Define Needs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Determine Opportunities</td>
</tr>
<tr>
<td>2</td>
<td>Design</td>
<td>3. Design Solutions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Decide Resources</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. Develop Attitude (for change)</td>
</tr>
<tr>
<td>3</td>
<td>Execute</td>
<td>6. Derive Norms</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7. Demonstrate Trials</td>
</tr>
<tr>
<td>4</td>
<td>Monitor</td>
<td>8. Deduce Results</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9. Defend (new) Process</td>
</tr>
</tbody>
</table>

A. Plan

“Planning is the thinking process, the organized foresight, the vision based on the fact and experience that is required for intelligent action”. (Alford & Betty). The planning is required before actual initiation of any activity. Agro processing industries can use this model as explained through the example of food processing unit.

1. Define Needs:
   For a food processing unit, the first step of reengineering is to determine exact needs of the market. Market needs can be identified through the data available from market research and other primary and secondary methods of data collection.

2. Determine Opportunities:
   After ensuring the need of the market, probable opportunities can be anticipated by applying different techniques of environmental scanning. This step will provide a sound foundation for next phases of the model. The profitability can be foreseen by garbing opportunities as a result of this step. The processed food is need of increasing population; hence, there is an opportunity in terms of enhancing existing market.

B. Design

Designing is the process of realizing the ideas imagined in the planning phase. It gives appropriate guidelines and structure so that plans can be materialized. This phase includes following steps.

1. Design Solutions
   Once it has been ensured that there are opportunities in the market, then different options are to be sorted out to convert plans into facts. Internal and external sources can be tapped for generating maximum number of alternative solutions. The food processing unit can work for identification of different solutions through techniques like brainstorming.
2. Decide resources:

Once an affordable solution has been finalized, the next step is to estimate the required quantity and variety of resources. It may include acquisition of new technology, skilled work force, additional investment etc.

3. Develop Attitude:

If the new solution demands considerable changes in the existing process, then there is possibility of friction. It may be among respective work force or concerned team of executives. This changeover will be smooth only if attitudes are developed in correspondence with the expected change.

C. Execute

This is the implementation phase. Practical difficulties may be recognized here. The previous phases develop hypothetical background, which is used for practical application of the decision. It includes following steps.

1. Derive Norms:

It is necessary to decide appropriate benchmark that can be served as minimum basic target to be achieved. The norms or standards can be treated as self control tools. For example, in case of quality assurance, different standards are to be set well in advance. All processing activities should be focused on these norms.

2. Demonstrate Trials:

Before approving the changed process, there is a need of critical analysis of all steps involved in the entire chain of operations. These trials may be in terms of pilot production, test marketing etc.

D. Monitor

This is the last phase in Business Process Reengineering model suggested for agro process industries. Monitoring is measurement and correction of the performance of activities to ensure that respective objectives and plans devised to attain them are accomplished successfully. It comprises following steps.

1. Deduce Results

Different resources applied for carrying out the revised process are to be monitored appropriately. There should not be exploitation of resources like man, machine, methods, material and money. The economic utilization of these resources leads to deduce expected results.

2. Defend Process:

In this step, the revised process yielding satisfactory results is installed. There is no need to go back to the previous process once new method has been established.
8.4.1. Results of Nine-D Model

In this way, the Nine-D Model will ensure,

1. Optimum utilization of resources.
2. Reduced hindrances in sequence of operations.
5. Ongoing improvement in quality of products and services.
6. Appropriate use of available capital.
8. Competitive advantage in cut-throat competition
9. Use of cost effective and locally developed processing methods
10. All round development of surrounding area
11. Utilization of clean and green technology
12. Strict control over wastages and post harvest losses.

Thus Business Process Reengineering embedded in the Nine-D Model has proved as s panacea for Agro Process Industries.

8.5. Implementation of the Nine-D Model

The proposed Nine-D Model can be executed with below mentioned systematic program. This program is flexible to accommodate different promising agro-processing sub-industries in the medium to long term development. The major components of program are:
1. Technology Development Acquisition and Adoption Component (TDAAC)
2. Institutional Capacity Building Component; (ICBC)
3. Logistics Support System Development Component (LSSDC)

These component programs are designed with clear understanding and consideration of different technological, marketing, and institutional constraints currently imposing hurdles in front of the agro processing industry.

8.5.1. Technology Development Acquisition and Adoption Component (TDAAC)

The Technology Development Acquisition and Adoption component program aims to:
1. Generate technology that encompasses the entire supply chain of agro-processing industry.
2. Encourage adoption and adaption of technology most especially in processing, drying, packaging, transportation, storage and handling.
3. Develop technologies in the production of raw inputs directed towards improving cost efficiency and quality.
4. Develop technologies, processes and methodologies to address agro products’ safety requirements.

These objectives can be fulfilled through development of sub-components to ensure following activities.
1. Testing of agro processed products and evaluation of the quality
2. Product development and pilot production
3. Inspection and review of plant and processes to assure quality of products.
4. Training of people involved in entire system of agro process industry.
5. Research and Development in industry related problems and development of indigenous technologies.

Industry competition is fragmented which limits innovation. There are very few large growers each of which has its own strategy of marketing distribution. Collective strategy in production, marketing and promotion is not sufficient to move faster turnover of produce in the domestic market and to enter foreign markets. Largely, the industry lacks the capability to do long term R&D.

8.5.2. Institutional Capacity Building Component (ICBC)

The agro-processing industry as a cluster is practically financed through equity. Access to credit is a problem as small processors could not meet the stringent requirements of lending financial institutions. It thus limits acquisition of capital and expansion of operation. The inadequacy in R&D has resulted to over dependence on external suppliers for planting materials and other inputs. Deficient transport, storage and handling facilities have constrained production especially during the peak season. The absence of an industry quality standard has kept prices low. This could be beneficial to the industry in terms of import substitution. But it is also indicative of low quality products. Moreover, due to inefficiency in the different parts of the agribusiness system, there is uneven growth of the different components of the cluster a clear indication that the industry is experiencing competitive dysfunction. The necessary requirements for operations are:

1. Creation of the agricultural machinery and equipment service center (AMESC).
2. Establishment of strong farmers’ clusters or cooperatives.
3. Tie-up program between farmers and producers cooperatives and the center.
4. Linkage with financing institutions and private sector investors.

Agricultural Machinery and Equipment Service Center Sub-Component (AMESC)

As shown in Figure 8.2, the AMESC shall be operated and managed by the agro producers. Farmer’s cooperatives can invest and be a partial owner of the enterprise. The Development Agency (DA), works on R&D activities to impart technical assistance.
The center will have the following infrastructure and processing facilities:

1. Farm machinery and equipment
2. Irrigation equipment
3. Workshop tools and equipment
4. Warehouse with office space
5. Drying and processing facility
6. Light cargo vehicle

8.5.3. Logistics Support System Development Component (LSSDC)

The agro processing sector is at the crossroad of eroding competitiveness which is manifested by high cost of producing commodities and food leading to higher prices in the market. This sectoral condition is primarily caused by inadequacy of competitive assets (i.e., infrastructure, transportation and communication, technology, human resource, and financial resources) and competitive processes (i.e., quality, responsiveness, and reliability). Considering the sector’s underdevelopment, supply chain in general and the logistics system in particular play a very significant function. Thirty to 40 percent of processing, marketing, and distribution are due to logistics. Given the state of the sector’s logistics system, high costs are incurred because of product delivery delays, high percentage of unfilled orders, and long lead time impressing significant impact on product quality and output price. More
importantly, management of information, which is one of the major functions of logistics, is crucial.

ICT specifically can provide the following function to improve supply chain management in general and logistics chain management in particular:

1. centralized coordination of information;
2. integration of transportation, distribution, ordering, and production;
3. direct access to both domestic and global transportation and distribution channels;
4. transparency allowing locating and tracking the movement of goods;
5. consolidation of acquisition of inputs;
6. intercompany and intra-company information access;
7. data and information interchange;
8. data access at the consumption and production points;
9. instantaneous updating of inventory levels in real time

ICT is important in attaining cost efficiency, responsiveness to consumer’s requirements and reliability in delivering the right kind of product and volume of product required by the market. ICT application to the agro-processing industry can bring the following benefits to logistics system management:

a. Cost savings and price reductions from lower transaction costs.
b. Cost savings from reducing non-value activities thus eliminating excess intermediaries.
c. Cost savings and better responsiveness from shortening supply chain/logistics chain transaction times for ordering and delivery.
d. Better and wider choices and more information for customers that could foster higher competition among producers.
e. Collection and analysis of large volume of industry data.
f. Gaining access to both domestic and global markets, supplies and distribution channels.

The Logistics Support System Development (LSSD) component program shall develop new logistics systems support facilities which would aid in streamlining the highly inefficient agro-processing industry logistics chain. Specifically, the objectives of the component program are:

a. To create and install strong Information and Communication Technology (ICT) networks across the agro-processing industry’s supply chain;
b. To create a private sector-led logistics management group that shall ensure efficient and effective delivery of logistics services; and
c. To ensure that all agro-processed products are compliant with food safety requirements.
8.6. Conclusions

India is all set to become the agro produces supplier of the world. It has the cultivable land, all the seasons for production of all varieties of grains, fruits and vegetables, etc. Well developed agribusiness system that works in its own way to nurture the changing food habits of the population. This situation leads to address increasing need for healthy processed food. There is an equal opportunity for development of non-food processing units.

But the major weakness is in supply chain network. Each product from food and non-food category can be rigorously analyzed independently as well as cumulatively. This research has focused only on specific categories and products where the suggested ‘Nine-D Model’ can be applied. There is wide scope to carry out further research on each product, category and functional areas from agro processing sector.