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Agriculture-Industry Interface: Value Added Farm Products



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Value-Added Farm Products

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). Studies also reveal that more than four dozen value-added products are produced from derivatives of paddy in a small country like Japan, which produces only 2 per cent of the total world production of paddy. 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).

In India, the difference between price paid by consumers for valueadded products and farmer's realisation has been increasing rapidly. Further, the food processing industry is plagued by high-risk profile, poor infrastructure and outdated technologies and taxation laws. There is also a lack of backward linkage between farmers and processors. This leads to non-uniformity and inconsistent supply of raw material, longer chain of intermediaries and lack of adequate economic benefits to farmers.

Value addition is often understood in the context of adding value to the product. A new dimension from the consumer point of view is added to the existing understanding of value i.e. how a consumer perceives the value delivered to him through a bundle of product services. This 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. In other words, consumer orientation is required in all spheres of agricultural sector. 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, modern processing technology, packaging of processed foods, branding, marketing e.g. potato chips, breakfast food, noodles, macaroni, etc.

Need for a Change

The slow down in the Indian economy is of serious concern to every one, in the government, in industry, and in all the sectors of the economy. Today, we are at less than 6 per cent growth level, which is below the planned target. Even more worrying is the fact, that the growth rate has been tending down for the last three years. Agricultural growth has dropped to 0.9 per cent from the average of 3.9 per cent in 1980s and 3.3 per cent in the nineties. In the Indian context, agricultural growth has a strong multiplier effect across the economy. Many of the models show that the modest incremental growth of 3 per cent in agriculture would lead to another 2.6 per cent growth for manufacturing taking the overall GDP growth up by 1.7 per cent—closer to 8 per cent mark and above 10th Plan ambitions.

Time has come when agriculture has to be run as an 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-use, 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 agriwastes generated during onfarm processing; agro-industrial systems development; and bio-process technology for conversion of raw agricultural produce to useful products.

World markets are undergoing a major transformation. Today, major markets are product-driven and less commodity-driven. To boost economic returns from farming, we must find ways for farmers to earn a greater share of the product sale revenue after adding value to their own produce. Strategies and organisational models to be adopted will vary from crop to crop and region to region and for meeting different technological and social needs. In order to discuss these issues, the National Academy of Agricultural Sciences organised a Round Table* on September 14, 2002.

The Round Table focussed upon discussion on a few selected commodities where (i) we have abundant production and consequently, the storage problems, (ii) technologies for processing and/or value addition are available readily or can be generated with little modification on existing ones and (iii) national or international demand for such products exists. The group debated and identified some suitable working models for backward linkage with farmers and forward linkage with marketing groups so as to benefit all the partners.

* A Round Table organised on September 14, 2002, at New Delhi under the Convenership of Prof. Akshey Kumar Gupta. The Round Table was attended by about 25 participants representing scientific institutions, planning bodies, state agricultural universities, industry and farmers.

The value chain, as existing in India was studied and compared to those existing in some other countries. Goals were identified, and strategies were suggested for creating a favourable environment to achieve development of value-added products. To prepare a model for initial action, the discussion was restricted to the following commodity chains only:

1. Wheat and rice
2. Fruits and vegetables—Mango, Citrus and Potato
3. Milk and dairy products
4. River and marine products

Closer farmer-processor relationship was the core of discussion. It was emphasised that this relationship needs to be a win-win type of relationship, with reduction of intermediaries. The producer should also be permitted to trade and the laws need to be amended for this.

Action needed for providing effective financial support, favourable government policies and laws, and linkages among producers, industry, R&D institutions and other partners, were broadly suggested.

Recommendations

1. General

- To meet the emerging challenges, agriculture must diversify in favour of high-value enterprises. The emphasis should be on production of high value commodities e.g., fruits, vegetables and fish with enhanced quality and specific nutritional and processing characteristics, than increasing production *per se* as in the past. Pricing policies also need to be changed, linking it with the quality of the produce or a product is 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.
- 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 food items from cereals, fruits, milk and fish. Appropriate and cost-effective packaging technology for these items is needed to ensure safety and prolonged shelf life.
- Agriculture is fast becoming demand driven from the earlier supply driven situation. For the foodgrains like wheat and rice, government support in the form of assured purchase as done in past will not be the same in years to come. Farmers will have to grow specific varieties needed for processing or add value to their produce. Policy and legislation must be reformed to allow processors to purchase their produce requirement directly from the farmers.
- Intermediaries in the food chain, lock value and add to cost of the raw materials sometimes by even 80 to 100 per cent. Effective linkages need to be built between

farmers and processors on a mutually beneficial contractual agreement, particularly when a large number of small farmers are to be involved in contract farming.

- Self-help or common interest groups on the model of cooperatives should be encouraged to enhance the bargaining power of the farmers and negotiate effectively with the industry, just as is being done in Kerala and Punjab.
- Model of the Town and Village Enterprises (TVEs)* of China is excellent for involving surplus rural labour in industrial activity by providing them alternative work at their doorstep. This should be adopted with suitable modifications, for primary processing of the agricultural produce and effectively linked to urban units for secondary processing, product development and marketing.
- Location of food-processing units should be strategically placed depending upon 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, as done for IT industry.
- Many times indigenous technologies are better suited for application than the imported ones. There is an urgent need to have a scientific database of these technologies so that one can compare the ones that are offered to us by other countries. There are nearly 200 major indigenous technologies for food processing which have been listed by CFTRI. NABARD or other financial institutions should finance this activity.
- There is an urgent need to have commodity-based management systems to advise the governments and R&D institutions 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 collecting system should be networked with all user agencies and farmers in the country, using latest IT technologies and infrastructure.
- Processing of agricultural raw material, generates a sizable amount of utilisable by-products, commonly termed as 'waste'. Experimental protocols for converting these into usable coproducts are available. These need to be developed into commercially viable technologies. These ventures would be a success if main product

* *The Town and Village Enterprises (TVEs) of China represent a middle ground between private ownership and the state ownership. It has led to the emergence of rural entrepreneurs and enterprises at such a large scale and a rapid rate, which has not been experienced by any other country. TVEs are today a vehicle to increase rural income, absorb a large amount of surplus rural labour and check their migration to urban areas. Their growth has been critical to the success of transforming China to a market economy.*

TVEs are industrial enterprises owned by local governments and citizens and generally produce consumer goods for domestic and foreign markets. They operate on a competitive-cooperative basis. Because the local governments can retain the revenues from TVEs, they have been managed efficiently and the loss-making ones are closed down. This created a domestic competitive environment. The TVEs are financed by local financial institutions and some even by foreign investors (World Bank, 1996).

manufacturing is undertaken in consonance with the by-product processing. Government regulations and policies must be suitably amended to facilitate this.

2. Commodity-based Recommendations

2.1 Wheat and Rice

- The varieties of wheat and rice grown, now have been developed primarily for increased yield and lack the quality characters required for making products other than *chapatis*. R&D programmes should focus on developing varieties for specific end-use and processing qualities.
- The varieties grown at present, however, are more suited for making some traditional food items. The technologies for making these products are available with SAUs and labs of CSIR and ICAR. Their marketing potential should be explored and efforts made to make them into commercially viable propositions.
- Processing units should be linked to areas/zones that should grow specific varieties for specific products. Contract/Contact farming can meet this end. FAQ laws must be amended and production/procurement policies must provide economic incentives to farmers to produce quality grain.
- Current post-harvest handling of grains results in high losses and leads to deterioration of quality. Storage and handling technologies and infrastructure should be designed in a manner that losses are minimised and the produce retains its original quality. Post-harvest care involving grading, storage and phyto-sanitation of the produce should meet the needs for export market.
- 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 biochemicals, as is being done in many other countries. One such unit has recently come up in Punjab.
- Separate boards for wheat and rice 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 national and international markets. Strategy formulation at the state and national level, development of infrastructure and facility for micro-level operators and intervention, wherein needed, should also be the role of these boards.

2.2 Fruits and Vegetables (Mango, Citrus and Potato)

- R&D programmes should focus on end-use of the produce, both for international market and the processing needs. For example, mangos of attractive skin colour and size are needed for export and potato varieties with large uniform tubers, and those with delayed sprouting will be preferred for processing and reduced storage losses.

- Mango pulp units should be set up in villages or clusters, and should ensure packing under SPS conditions. Processing units to make useful co-products like oil from mango kernels and beta carotenoids from peel should be set up alongside the pulp making units.
- Protocols for making traditional mango products e.g. *chutney, achar, aampapar, murabba* need to be standardised for manufacturing under SPS conditions and promoted to produce quality products. These must also be packed appropriately and attractively.
- In cases where debittering of citrus juice is not feasible, it should be blended with other juices after appropriate R&D to meet the taste of consumers and prolong the shelf life.
- Potato varieties *Chipsona-I* and *Chopsona-II* match, or are even better than presently used international varieties for making chips and fries. These should be promoted among farmers and farmer-linked processing units.
- Since MH is known to inhibit sprouting of potato in storage, its import should be made easy.
- Technology for converting potato powder to high fructose syrup should be exploited at a commercially viable scale.
- Peel, pulp and seed from different fruits are invariably discarded as 'waste'. These can be converted into valuable coproducts. Technologies for production of oil and natural colour from citrus peel; fibre from banana leaves; oil and a rare protein from mango kernel, have been developed. These have to be made as economically viable propositions.

2.3 Milk and Dairy Products

- Even though over 80 region-specific dairy products are known yet no scientific documentation of these products is available. Agencies and institutions concerned, must urgently take up this work. Some of these traditional products, backed by R&D support for processing and packaging could be elevated to commercially viable ventures for national and international markets (just as is being done for *Shrikhand* and *Rasogulla*).
- Attention must be paid to develop nutritive foods using whey that is rich in protein. One possibility is to supplement it with nutra-ceuticals, followed by gelling and suitably packaging to enhance its shelf life.
- Milk quality suffers from high levels of pesticide residues and heavy metals (which come through feed and fodder) and antibiotics mixed in feed or given for treating mastitis. This should be checked and monitored at the time of procurement to develop internationally competitive and pesticide-free products.

- 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.
- There are natural anti-bacterial agents in milk of camel/goat/sheep, which has a shelf life of 8-10 days. R&D efforts should be initiated for blending cow/buffalo milk with these milks, wherever possible. This will enhance shelf life and reduce handling costs.

2.4 Fish and Marine Products

- Traditional preparations like fish/prawn pickle, fish *papad* and fish curry, battered and breaded products, fish mince (*Surimi*) based products like sausages, cutlets, patties, balls, pastes etc., need to be promoted in ready-to-eat packs. The packaging should be such that ensures quality and hygiene as per international standards, with proper certification.
- Since India has a higher fish processing capacity than the total catch capacity, the idle workforce could be effectively engaged in making products based on *Surimi* from low value/by-catch fish which otherwise fetch poor returns to the farmers.
- Sea-weed farming should be commercialised and sea weeds used for preparation of nutritive foods and feed items.
- Post-harvest handling of fish and prawn catches must be done as per international standards of sanitation. This is essential if we are to compete in the global trade. It will require extensive cold-chain and appropriate storage infrastructure till the catch is processed or consumed.
- Fisheries waste generated by the processing industry should be used for developing usable co-products like chitin and chitosan from prawn shells, sutures from fish guts, the technology for which is available.

2.5 Public Policies

- Policy and legislation must be amended to enable the processors to procure cereals like wheat and rice directly from the farmers. This will be cost saving and also ensure the authenticity and traceability of material.
- Policy reforms should be made so that cooperative units work as competitive units, self-supporting on their own strength, after a one-time initial financial support, on the lines of the TVEs of China. State government should act as a facilitator of cooperatives and not as controller, as is the practice now. These should be self-managed units, with appropriately defined independent dispute-handling procedures.
- Multiple taxation on value-added products hinders development. The taxation laws should be simplified soon, as also envisaged in the draft National Food Processing Policy.

- Special laboratories must be established in public and private sector for export certification of food consignments for the levels of antibiotics, pesticide residues, pathogenic organisms, heavy metals, impurities etc. as per Codex standards.
- 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.

2.6 Banking Support

- Technology generating institutions must help in developing the techno-economic project profiles, leading to bankable proposals for the prospective entrepreneurs.
- Self-help women groups have successfully taken up some parttime activities with support from NABARD and other institutions. These groups should be assisted in making traditional foods as per Codex standards, with proper training and financial back up.
- Simplified credit facility should be provided to farmers and their cooperatives that wish to undertake value addition to their produce. First-loss-risk-cover should be provided to these farmer-entrepreneurs.

2.7 Management Models

- Processing units, adding value to agricultural produce, should lay emphasis on developing effective backward linkages with farmers, to procure quality raw material.
- Contract farming should be promoted in a manner that processing firms are not able to exploit an unequal relationship with growers. Most contracts in the past have been tilted against farmers and also some farmers have diverted the produce to open markets.
- The New Generation Cooperatives (NGC) model is ideal since it binds both farmers and processors to honour commitments and agreements. This should be applied in our cooperative enterprises. Contract farming involving small farmers should be promoted rather than involving a few big farmers.
- Small cooperative processing units should be promoted in rural areas. These could undertake primary processing, grading and cleaning of produce for adding value. The pattern of Town and Village Enterprises (TVEs) of China, could be used, with necessary modifications.
- 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.