



Training Programme on
LINKING FARMERS TO MARKETS

READING MATERIAL

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1. LINKING FARMERS TO MARKET

Linkages between farmers and market call for priority attention to issues on access to technology, information on institutional arrangements, support services, policies, capacity building, identification and development of markets. The problem of access to market is more pronounced for small and marginal farmers. Being smallholders, these farmers suffer from some inherent problems such as absence of economies of scale, access to information and their inability to participate in the price discovery mechanism.

There is an added importance attached to linkage to market for the farmers in the context of new challenges and issues relating to market. Also, there is a shift in demand and opportunities for a rapidly changing market environment brought about by trade liberalization and globalization. Rising incomes, population growth, urbanization, changes in tastes and preferences have brought about some changes in the consumption pattern. The consumers are increasingly becoming aware about food safety and quality. Globalization offers opportunities for increased agricultural exports. The capacity of the farmers in India, most of whom are small and marginal, to respond to these issues is limited. Consequently, there is a need to enhance the capacity of the farmer to enable him to meet the new challenges.

1.1. *Challenges and Issues*

The role of small farms in development and poverty reduction is well recognized. In the current agricultural marketing scenario of the country, the following are some of the formidable challenges to be tackled for strengthening linking of the farmers to the market.

- **Low marketable surplus:** Most of the farmers are producing multiple crops on small/marginal holdings leading to low marketable surplus of each crop. Farmers generally don't find it profitable to take such a small quantity of surplus to the market resulting in heavy village-sale immediately after the harvest. Also they are often compelled to sell it to the village traders due to indebtedness or immediate need for cash. Even today, there is prevalence of pre-regulatory shortcomings like delayed payment and unauthorized deduction like *Karda, Dhalta, Muddat, darmada* etc.
- **Long marketing channels:** The long marketing channels with multiple intermediaries for different agricultural produce is the major cause for low share of farmer in the consumer's rupee. As reported by the Millennium Study of the Ministry of Agriculture, it varies from 32 to 89 percent in different commodities.

- **Poor Access to markets:** The National Commission on Agriculture, 1976, recommended that a market should ideally serve 80 sq. Km. area. The average area served by each regulated market now in the country is 435 sq. km., varying from 103.20 sq. km. in Punjab to 11214 sq. km. in Meghalaya.
- **Poor marketing infrastructure:** There is conspicuous paucity of infrastructure such as auction platform, drying platform, grading facilities, cold storages etc., in the present markets. The government, in XI Five Year Plan, envisaged investment in agricultural marketing infrastructure to the tune of Rs 64,312 crore with Rs 30,625 crore to be mobilized from private sector.
- **Non-transparent price discovery mechanism:** The traditional price discovery mechanism prevailing in a typical regulated market is not transparent. The method prescribed for sale of agricultural produce in regulated markets is either by open auction or by the close tender method. The cumbersome process of manual tender and open auction systems in the regulated markets provide ample scope for manipulation of price formulation process. In order to overcome this problem, some states like Karnataka have introduced electronic tender of agricultural commodities in some of the selected markets.
- **Lack of market information system:** Farmers have got to be empowered with right information at the right time and place so that they can improve their bargaining capacity in the market. The existing market information system leaves much to be desired in this respect. The last mile linkage in the existing marketing information system has got to be made to benefit the small, marginal and illiterate farmers.
- **Fledgling rural periodical markets:** Rural periodical markets are the first touch points of the farmers with the market circuit. Since the strength of the chain lies in its weakest linkage, the rural markets need to be equipped with requisite infrastructure to reduce post-harvest losses and ensure higher returns for the farmers. Majority of these markets lack even basic infrastructure, though 15 percent of these markets are now under the ambit of regulation. These markets may be effectively utilized for improving the access of farmers to market.
- **Enabling free play of market forces:** The system may be improved by allowing free play of market forces for better price formation. There is a need to do away with avoidable licensing, restriction on storage and movement of agricultural produce. With these measures, the system will go a long way towards bringing about integration in the marketing system.

- **Reforms in Agricultural Marketing:** It is heartening that 17 States of the country have brought about reforms in agricultural marketing in conformity with the Model Act, 2003 of Government of India. However, these States have confined themselves to only three aspects of reforms viz., contract farming, direct marketing and setting up of private markets. These states should adopt the rest of the reform measures and other States should reform their agricultural marketing system.

1.2. Opportunities for Small Holders in Different Systems

Several innovative marketing models have evolved across the country in isolation like contract farming, cooperative and producers' companies. The collaborative efforts of the stakeholders have contributed to the success of these models. These models, by and large, are able to address the shortcomings of the traditional marketing system. These are found to be effective in aggregating the small holders also. In view of the reforms process initiated by Government of India, there is better scope for implementing these models with customised approach. An analysis of the suitability of some of the innovative marketing models for small holders in linking them to market is placed below.

Details of Innovative Marketing Channels Evolved In India

Problem	Contract Farming	Cooperative marketing	Producers' Company
Knowledge & information	Introduction of new technology and skill transfer	Group approach helps in sharing knowledge and information	Providing advice to farmers on various technical issues
Input supply	Provision of quality inputs and production services	Scale of operation helps in procurement of quality inputs	Facilitate purchase of inputs
Credit	Access to credit	Provided by the cooperatives	Facilitate provisions of credits
Price	Guaranteed and fixed pricing structures	Competitive price through arraignments of sale proceeds	Competitive prices through forward linkages
Long marketing channels	Buy back arrangements Direct link with buyer	Effective forward linkages	Aggregation and collection from doorstep
Poor market availability	Assured market	Group approach helps in enhancing access to market	Assured market by providing forward linkages
Infrastructure barrier	Backward linkage through collection centre/ purchase at doorstep	Managed by cooperative through pooled resources	Managed by company

Prompt Payment	Immediate	Standardised procedure	Immediate payment specially to small holders
Value addition	Processing	Processing	Processing
Successful models	Successful in some of the crops like soybean, vegetables, medicinal and aromatic plants, gherkin etc.	HOPCOMS, NDDDB, Mahagrapes, Amalsad, etc	Indian Organic Farmers' Producer Company Limited, Kochi, Kerala, Eco Tasar Private Ltd. etc.

1.3. *Alternative Approaches for the linkage*

Institutional, informational and developmental were the three approaches proposed for linking farmers and markets (Table). These three approaches, having proven successful in many developing countries, cover aspects like developing skills, knowledge, competencies, information needs of learners for effective adoption of practices and helping people with problem solving and/or coping strategies.

Approaches to Linking Farmers and Markets

Approach	Content	Delivery	Audience
Institutional	Market Intelligence, Marketing Information, Agri-business, Value addition through processing, Post harvest	Training, Seminars, Workshops, Extension programmes	Extension agents, Farmers, Private agencies, Market operators, Cooperatives, Agri-businesses
Informational	Market reports, Price forecasting, Post harvest technology, Grading and standardization, Quality control	Radio, Television, Distance education, News letter, Farm and home visit	Farmers, Market operators, Cooperatives, Rural women and youth
Developmental	Storage, Sustainability, Agri-business, Cost-benefit,	Demonstration, Field visits, Face-to-face meetings, Group discussion	Supply chains, Cooperatives, Wholesalers, Extension agents, Farmers

Source: Radhakrishna & Jackson, 2013

<http://globalfoodchainpartnerships.org/india/Papers/Posters/RamaRadhakrishna.pdf>

1.4. Measures for better Access/Linkage

In order to give the farmers better access to market, a number of reform measures have been undertaken by Government of India in recent years.

The scope of marketing reforms adopted by the GOI widened and the pace of reform hastened during the last decade. The most critical actions were:

- **(1) in 1998**, repeal of the Cold Storage Order 1964, which eliminated the licensing requirement and government control over cold storage fees;
- **(2) in 2002**, lifting the licensing requirements, stocking limits, and movement restrictions for wheat, paddy/rice, coarse grains, edible oilseeds and edible oils, and removing restrictions on access to credit under the Selective Credit Control Policy;
- **(3) also in 2002**, amending the Milk and Milk Products Order 1992 to remove restrictions on investments by the private sector in dairy processing and to focus on food safety issues;
- **(4) in 2003**, eliminating the ban on futures trading of 54 commodities including wheat, rice, oilseeds, and pulses 3 and
- **(5) since 1997**, removing several agricultural products from small-scale reservation. In 2003, the GOI formulated the Model Act to reform the Agricultural Produce Marketing (Development and Regulation) Act 1951. The Model Act aims to foster a single market in the country by removing the restriction on selling agricultural commodities wholesale only in state-regulated markets and permitting the private sector to develop and operate wholesale markets. In 2006, parliament approved the Food and Safety Standards Act, which rationalizes the complex and overlapping web of regulations governing food processing and the Warehousing (Development and Regulation) Act, which will facilitate access to trade credit. The GOI also repealed the Cess Act, thus eliminating the 0.5 % cess on agricultural and plantation exports.

Major GOI agricultural marketing policy reforms, 1998/99-2005/06

Year	Policy reform
1998/99	<ul style="list-style-type: none"> • Cold Storage Order 1964 repealed
2001/02	<ul style="list-style-type: none"> • Restrictions on domestic and foreign investments (up to 100 percent) in bulk handling and storage removed • Inter-Ministerial Task Force and Committee of State Ministers on Agricultural Marketing Reforms established
2002/03	<ul style="list-style-type: none"> • Licensing requirements, stocking limits, and movement restrictions on wheat, paddy/rice, coarse grains, edible • Oilseeds, edible oils, and selective credit controls lifted • Milk and Milk Products Control Order (MMPO) amended to remove restrictions on new milk processing capacity, • while continuing to regulate health and safety conditions • Leather and leather and paper products removed from small-scale reservation list
2003/04	<ul style="list-style-type: none"> • Ban on futures trading of 54 commodities, including rice, wheat, oilseeds, and pulses, removed • Levy on sugar reduced from 15 percent to 10 percent • Model act for State Agriculture Produce Marketing (Development and Regulation) formulated • Processed food items exempted from licensing under Industries (Development and Regulations) Act 1951, except • Those reserved for small-scale industries (SSIs) and alcoholic beverages • Food processing included in list of priorities for bank lending • Automatic approval for foreign direct investment up to 100 percent for most processed foods, except alcohol and beer and those reserved for SSIs
2004/05	<ul style="list-style-type: none"> • Group of Ministers established to formulate modern integrated food law
2005/06	<ul style="list-style-type: none"> • National Horticulture Mission initiated
2006/07	<ul style="list-style-type: none"> • Food Safety and Standards Act approved • Warehousing (Development and Regulation) Act approved • Repeal of Cess Act • Forward Contracts (Regulation) Amendment Bill submitted to parliament

Source: Ministry of Finance 2002, 2003a, 2004a, 2004b, 2005a, 2006; Ministry of Food Processing Industries 2002,2004,2005a; Department of Food and Public Distribution 2005.

2. REGULATED MARKETING SYSTEM IN INDIA AND REFORMS

It goes without saying that marketing and production of agricultural produce are inextricably intertwined with each other. In the post-WTO regime, an effective agricultural marketing system is the key driver of the agricultural economy of a country. An effective marketing system aims at ensuring remunerative prices to the producers at cost effective marketing costs and smooth supply of commodities to consumers at reasonable prices. In order to protect the interests of the various stakeholders of the agricultural marketing system of the country, a number of governmental interventions have been taken from time to time. However, the present agricultural marketing system of the country leaves much to be desired. There are many imperfections in the marketing system for agricultural commodities. Some reform measures by the government have already been initiated to address these issues and some are in the pipeline. This chapter includes a description of the traditional marketing system for agricultural commodities and the steps taken by the government from time to time to overcome the defects and to improve the marketing system.

2.1. *Characteristics of Traditional Agricultural Marketing System*

The problems of agricultural marketing have received the attention of the government for a long time. As early as in 1928, the Royal Commission on Agriculture had pointed out that the then existing system did not meet the requirements of an ideal marketing mechanism. Some of the important characteristics of the traditional marketing system for agricultural commodities have been discussed below: Many of these still exist, though efforts are under way to improve them.

(i) Heavy Village Sales of Agricultural Commodities

A majority of farmers in India sell a large part of their produce in villages resulting in low returns for their produce. There is a difference in the price prevailing at different levels of marketing, i.e., the village, the primary wholesale market, the secondary wholesale, and retail levels. The extent of village sales varies from area to area, commodity to commodity, and also with the status of the farmer. The village sale is 20 to 60 percent in food-grains, 35 to 80 percent in cash crops and 80 to 90 percent in perishable commodities. This practice is very common even now. The factors responsible for village sales are –

- a) Farmers are indebted to village moneylenders, traders or landlords. They are often forced either to enter into advanced sale contracts or sell the produce to them at low prices.

- b) Many villages are still not connected by roads. Adequate transport means are not available even in villages connected by roads. It is difficult to carry the produce in bullock or camel carts to markets, which are often situated at long distances.
- c) There is only a small quantity of marketable surplus with a majority of the farmers because of the small size of holdings.
- d) Farmers are hard-pressed for money to meet their social and other obligations, and are often forced to sell their produce right in the villages.
- e) Most of the perishable products need to be marketed in the villages because of their low “keeping” quality and the non-availability of quick transport means.
- f) Many farmers disliked city markets mainly because of their lack of knowledge about prevailing market practices, the possibility of theft or robbery in transit and problems faced by them for selling their produce in city markets.
- g) The information on the prices prevailing in the nearby primary and secondary wholesale markets is not readily available to the farmers.

(ii) Post-Harvest Immediate Sales by Farmers

A majority of the cultivators tend to sell their produce immediately after the harvest at low prices prevailing at that time. Because of substantial supplies, Indian markets are glutted in the post-harvest season. Traders often take advantage of this situation. About 60 to 80 percent of the food grains are still marketed in the first quarter of the harvest season.

- (iii) Inadequacy of Institutional Marketing Infrastructure and Lack of Producers’ Organizations
- (iv) Multiplicity of Market Charges
- (v) Existence of Malpractices
- (vi) Lack of Reliable and up-to-date Market Information
- (vii) Low Marketable surplus of a Large Variety of Products
- (viii) Absence of grading and Standardization of Produce
- (ix) Absence of Quick Transport Means
- (x) Strong Associations of Traders and Market Functionaries

2.2. State Marketing Departments

Marketing Departments were set up in the States as counterparts of the Central Marketing Department. The structure of the State Departments varies from State to State, and their status ranges from that of a full-fledged department to a cell under the Agriculture Department. However, all the States now have a marketing department/cell to look after the marketing problems of farmers.

With increasing role of agricultural marketing in the economic development of the state and the increasing activity of market regulation, State Agricultural Marketing Boards were set up in States and Union Territories. These State Agricultural Marketing Boards look after the regulation of markets and bring about an effective level of coordination in the functioning of the regulated markets at the State level. The market regulation scheme received momentum after the establishment of State Agricultural Marketing Boards in the State. In some states Agricultural Marketing Departments were merged with boards. However, National Commission on Agriculture in 1976 again recommended establishment of separate Directorate of Agricultural Marketing in every state.

2.3. Regulation of Agricultural Marketing

The features like high marketing cost, unauthorized deductions and prevalence of various malpractices prompted regulation of agricultural marketing in different states of the country. Establishment of regulated markets has been able to overcome the problems of traditional marketing system to a great extent. However, these problems still persist in the case of village sales.

Definition of Regulated Market:

A regulated market aims at ensuring correct weighing of produce, prompt payment to the farmers and avoidance of exploitation of farmers by middlemen. Regulated market is one that aims at the elimination of the unhealthy and unscrupulous practices, reducing marketing costs, and providing facilities to the producer-seller in the market. A legislative measure designed to regulate marketing of agriculture produce basically focuses on establishment of regulated markets.

2.4. Objectives of Regulated Marketing:

- a) To prevent exploitation of farmers by helping them overcome the handicaps in the marketing of their produce.
- b) To make the marketing system effective and efficient so that farmers may get remunerative prices for their produce and the goods are made available to consumers at reasonable cost.
- c) To provide incentive prices to farmers for inducing them to increase the production both in terms of quantity and quality.
- d) To promote an orderly marketing of agricultural produce by improving the infrastructure facilities.

2.5. History of Market Regulation

The need for regulation of markets arose from the anxiety of the British rulers to make available supplies of pure cotton at reasonable prices to the textile mills in Manchester. The first regulated Karanjia Cotton Market was established

as early as in 1886 under Hyderabad Residency Order. The first legislation was the Berar Cotton and Grain Market Act of 1897. The 1897 Act became Model Act for legislation in other parts of the country. The then Bombay Government was first to enact Cotton Market Act in 1927. This was the first law in the country that attempted to regulate markets with a view to evolving fair market practices. In order to overcome the problems of agricultural marketing in India, the Royal Commission on Agriculture in 1928 and Central Banking Enquiry Committee in 1931 recommended establishment of Directorate of Marketing and Inspection under the Ministry of Food and Agriculture.

Progress of Regulated Markets in India

Year ending	Number of Regulated Markets	Regulated Markets as percent of Wholesale Assembling Markets
1951	236	3.2
1953	336	3.2
1954	470	6.4
1956	740	9.8
1960	1150	9.8
1966	1966	11.5

012• 13
.87• •
Number of Regulated Markets as percent of Wholesale Assembling Markets
• • March
1951• 2
36• 3.2
3• • March
1956• 4
70• 6.4
4• • March
1961• 7
15• 9.8
0• • March
1966• 1
012• 13
.87• •
Regulated Markets as percent of Wholesale Assembling Markets

s • • Ma
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1951 • 2
36 • 3.2
3 • • Ma
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1956 • 4
70 • 6.4
4 • • Ma
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March
1961• 7
15• 9.8
0• • Ma
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1966• 1
012• 13
.87• •
715• 9.
80• • M
arch
1966• 1
012• 13
.87• •
9.80• •
• March
1966• 1
012• 13
.87• •
March
1966• 1
012• 13
.87• •
1012• 1
3.87• •
13.87•
• March
1976• 3
528• 48
.37• •
March

1976• 3
528• 48
.37• •
3528• 4
8.37• •
48.37•
• March
1976• 4
446• 60
.96• •
March
1976• 4
446• 60
.96• •
4446• 6
0.96• •
60.96•
• March
1986• 5
766• 79
.06• •
March
1986• 5
766• 79
.06• •
5766• 7
9.06• •
79.06•
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1996• 6
968• 95
.54• •
March
1996• 6
968• 95
.54• •
6968• 9
5.54• •
95.54•
• March
2001• 7
161• 98
.19• •
March
2001• 7
161• 98

.19 • •
7161 • 9
8.19 • •
98.19 •
• March
2011 • 7
190 • 98
.29 • •
March
2011 • 7
190 • 98
.29 • •
7190 • 9
8.29 • •
98.29 •

2.6. Reforms

The main Act for market regulation, “Agricultural Produce Market Regulation Act” is implemented by the State Governments. A network of more than 7100 regulated markets & about 28000 Rural Primary Markets services the marketing system of the country; and about 15% of which are also regulated. The objectives of market regulation initially were to ensure correct weighment, prompt payment to the farmers for their produce and to avoid their exploitation at the hands of middlemen. However, the markets originally meant for protecting the farmers from the clutches of the exploitation by middlemen ended up inhibiting the free play of market forces, pushing the interests of the farmers to the backburner.

Under the APMC Regulation, no exporter or processor could buy directly from the farmers, thereby discouraging processing and export of agri-products. Only State Govt. could set up markets, thereby preventing the private sector from setting up markets and investing in marketing infrastructure. The Inter Ministerial Task Force, set up by the Govt. of India in 2002, made an assessment of investment gap of Rs.12,400 crore by the year 2012 in agricultural marketing infrastructure.

The increasing focus on liberalization, privatisation and globalisation is both a challenge and an opportunity for our farmers. However, in order to enable our farmers to reap the external opportunities, effective internal reforms in the agricultural marketing system of the country are inescapable.

2.7. Regulatory Reforms undertaken

Since 2003, Govt. of India has initiated a number of reforms in Agricultural Marketing, while some others are in the pipeline. As a major initiative, the Govt. prepared a Model Act called Agricultural Produce Marketing (Regulation & Development) Act, 2003. All the States/UTs have agreed to amend their respective State APMR Acts in the line of the Model Act to bring about requisite reforms in the sector. The Salient features of the Model Act are setting up markets in the private/co-op sector, rationalization of market fees, promotion of contract farming, direct marketing and grading and standardization, including setting up of a Grading and Standardization Bureau in each State/U.T. The states have amended their Acts in respect of three aspects, i.e. contract farming, direct marketing, setting up of private markets only.

Agriculture being a State subject, the States have got to play a proactive role to adopt the desired reforms and push the frontiers of the agricultural marketing system of the country to the next level of excellence. It is time the States should go beyond the three areas of reforms and should adopt other areas of reforms such as setting up of Bureau of Standards and Grading at State level, promotion of marketing extension and setting up of responsive market information system etc. These reforms would go a long way towards attracting private investment to the sector, putting in place an integrated supply chain management system and promoting processing.

As regards other reforms, the Government of India has taken up the following measures:

- A warehouse Development and Regulation Authority has been set up. This is entrusted with the task of negotiable warehouse receipt in the agriculture sector. This will go a long way towards saving the farmers from distress sale of their produce
- A Food Safety Regulatory Authority has been set up to look after the food safety and quality issues.
- Strengthening of the Forward Markets Commission through amendment of the FCR Act is in the pipeline.
- Launching of the infrastructure scheme (AIGS Scheme) and the Rural Godown Scheme has gone a long way towards attracting private investment to agricultural marketing sector.
- Market Research Information Scheme of Government of India has been successful in disseminating price and arrival related information from almost all the wholesale markets of the country.
- The terminal market scheme of the government has the potential to promote setting up of a chain of Hub and Spoke model of markets through the country in PPP mode.

3. MODERN MARKETING METHODS

Introduction

Many growers, especially the new ones, are inclined to start production without giving any thought to the business of marketing. Good marketing is an absolute must for a successful agricultural enterprise. Some would even argue that it ranks higher in importance than production itself, especially for farmers planning to diversify. After all, of what good is a product if one cannot sell it for a profit? Diversification of crops entails familiarizing the farmers with creating new marketing systems for the new products. Existing marketing channels, very often, do not accommodate the producers of the new produce well, especially the small producers.

Alternative Marketing

Formal research on alternative marketing mechanisms has been scattered and hard to access by producers. It is mostly experiential and unrecognized by the agricultural establishment and official information channels. Small farmers and grassroots farm groups are the most likely to develop and use innovative marketing methods. The assumption that farmers must either "get big or get out" is being challenged. By the emergence of alternatives, it is possible for innovative farmers to stay small or medium-sized and make a comfortable and successful living from agriculture.

Exploring Alternatives

Sustainable farming, which received a boost following the farm crisis of the 1980s, has given impetus to diversified, decentralized systems in which farmers take greater control of marketing by bypassing traditional channels and marketing directly to consumers at the local and regional level. Foods that do not require much processing before consumption—like fruits, vegetables and meat—are ideal for one-on-one marketing. Direct marketing is often quite unorthodox and may take the form of roadside stands, pick-your-own operations, farmers' markets, and sales to restaurants, upscale retail or specialty stores—even supermarkets and institutional food service. Prospects for direct farmer-consumer interaction are particularly promising at the rural-urban fringe, where producers can take advantage of specialty market niches and the demand for local and ethnic food and non-traditional products, while promoting agricultural tourism and education.

3.1. *The various forms of alternate marketing*

- (a) Direct marketing,
- (b) Marketing through farmers' interest group,

- (c) Co-operative Marketing,
- (d) Forward and future market,
- (e) e-commerce,
- (f) Setting up of mega markets

3.2. Direct Marketing – Farmers’ Markets

Direct marketing by farmers is being encouraged as an innovative channel. Some examples of these channels are Apni Mandi, Rythu Bazars, and Uzhavar Sandies. These channels are mostly adopted in sales transactions of agricultural commodities like fruits, vegetables and flowers, which are highly perishable. In this channel, the produce moves quickly from farmers to consumers due to lack of middlemen. If farmers directly sell their produce to the consumers, it not only saves losses but also increases farmers’ share in the price paid by the consumer.

Farmers’ Markets were introduced with a view to eliminate the middlemen and arrange facilities for the farmers to sell their produce directly to the consumers at reasonable rates fixed every day. On account of the scheme, both the farmers and the consumers are benefited.

Apni Mandies in Punjab and Haryana

Punjab’s and Haryana’s *Apni Mandis* (Our Markets), established in the mid-1990s, were the first ones directly linking vegetable producers and consumers. Farmer-producers bring the produce for sale directly to the buyers or consumers. The Agricultural Produce Market Committee of the area, where Apni mandi is located, provides all necessary facilities like space, water, shed, counters and weighing balances

Rythu Bazaars in Andhra Pradesh

Government of Andhra Pradesh initiated the Rythu Bazaars on January 26, 1999. *Rythu Bazaars* are located on government lands identified by the District Collectors. The locations are decided in such a way as are convenient to both farmers and consumers. The criteria for opening of new Rythu Bazaars are the availability of at least one acre of land in strategic location, and identification of 250 vegetable growing farmers including 10 groups. The price fixation in Rythu Bazaars is through a committee of farmers and the Estate Officer. Adequate care is taken to fix the prices realistically. If the prices in Rythu Bazaars are higher than the local market rate, there is no incentive to consumers. And if the prices fixed are lower than the wholesale market rates, there are no incentives to farmers. The prices in Rythu Bazaars are generally 25 percent above the wholesale rates and 25 percent less than the local retail price. The maintenance expenditure of Rythu bazaars is being met from the financial sources of Agricultural Produce Market Committees.

Uzhavar Santhai in Tamil Nadu

Farmers' Markets are under the administrative control of the State's sixteen Agricultural Marketing Committees, which, in turn, are part of the Department of Agricultural Marketing. The Committees are also responsible for the administration of Regulated Markets, where farmers sell directly to traders without the intermediary of commission agents, and under a tender system supervised by Committee officials. Regulated markets also offer storage facilities to producers, to whom an advance is paid once the produce is deposited. Regulated markets deal with a predetermined list of commodities and especially food grains and other non-perishable items. With regard to the Farmers' Markets, the Committees are responsible for their overall administration.

All Farmers' Markets open at 6.30 in the morning, and usually close at 2.00 in the afternoon, although marketing committee staff remains until 5 p.m. to complete all the paper work. A notable exception is Maharaja Nagar Farmers' Market in Tirunelveli, which is open until 7.00 in the evening. This allows farmers to bring in their produce twice a day, and has, therefore, attracted larger number of farmers, who would otherwise find it difficult to dispose of higher volumes of produce in Farmers' Markets.

A committee including Marketing Committee officials and farmers' representatives fixes the price of the vegetables each day. Committee members collect the details of prices in the central and retail markets before 3.00 a.m. in the morning, and by 6.30 a.m. the maximum selling prices in the Farmers' Market are fixed at 15 to 20 percent more than the night sale price at the central market, and 20 percent lower than the price in the retail markets – whichever is higher. Farmers are not permitted to sell above the maximum price, although they are allowed to sell at a lower price. Prices are displayed on a blackboard at each stall, and staff constantly monitor that they are honoured. Farmers also get good quality seeds and other inputs in the market itself.

Hadaspar Vegetable Market in Pune

Hadaspar vegetable market is a model market for direct marketing of vegetables in Pune city. This sub-market yard, situated 9 kms away from Pune city, belongs to Pune Municipal Corporation and fee for using the space in the market is collected by the Municipal Corporation from the farmers. This is one of the ideal markets in the country for marketing of vegetables. In this market, there are no commission agents/middlemen. The market has modern weighing machines for weighing the products. Buyers purchase vegetables in lots of 100 kgs or 100 numbers. The produce is weighed in the presence of licensed weighmen of the Market Committee and sale bill is prepared. The purchasers make payment of the value of produce directly to the farmer. The purchaser is allowed to leave the market place along with the produce after showing the sale

bill at the gate of the market. Payment is made in cash. The supervisor of the Market Committee settles the disputes, if any, arising between the buyers and sellers, after hearing the concerned parties. The Market Committee collects one per cent sale proceeds as market fee for the services and facilities provided by the Committee to the farmer-sellers and buyers.

A common problem faced by the direct market systems is the infiltration of the bazaars by middlemen in the guise of farmers. Though identity cards have been introduced and periodical checks performed, the problem still persists in many bazaars.

3.3. *Farmers' Organizations in Marketing*

A study reveals that inefficient marketing system has led to an avoidable waste of around Rs. 50127 crores. Introducing scale and technology in agricultural marketing can save a major part of this wastage. Milk and eggs marketing are two success stories of the role of scale and technology in marketing. The extent to which the farmer-producers will benefit (out of saving of avoidable waste) depends on the group-marketing practices adopted by the farmers. In this sense, farmers' organizations need to be promoted for undertaking marketing activities on behalf of the individual members of the group.

Promotion of such organizations should be assisted or helped to create basic infrastructure for their effective functioning. This could even include assistance for professional management. In the following paragraphs, some examples of successful models are discussed.

MahaGrapes

MahaGrapes came into existence in 1991. It owes its origins to the Maharashtra State Agricultural Marketing Board (MSAMB). MahaMangoes and MahaBanana were also set up subsequently for mangoes and bananas respectively. The objective of the MSAMB was to promote the marketing of fruits by assisting farmers technically and financially and linking them to new domestic and international markets.

The active role of the State Government in bailing out MahaGrapes in times of crisis along with the financial support and subsidies by APEDA and NCDC bailed out MahaGrapes. After this initial backing and assistance, MahaGrapes has not looked back and has been steadily growing; MahaGrapes currently exports grapes to Europe, the Middle East and in recent years to Sri Lanka. Thompson seedless is the main variety of grape exported.

The firm does not retain the profit it earns. It charges a nominal fee (Rs. 4 per kg.) for grapes exported by the firm for a farmer. This amount helps in covering the operational costs of the firm. This broadly includes wage cost of the firm's employees and transportation cost of sending the product to distant

markets. The rest of the profit earned is passed on to the farmers. In addition, MahaGrapes/Cooperatives charges Rs. 7 per kg of grapes for pre cooling and cold storage charges.

When amounts marketed by individual members vary across members, conflict over the cost allocation rule adopted by the cooperative is likely to occur. In MahaGrapes, the allocation of costs related to the storage and cooling or contribution to operational costs is proportional to the amount marketed by the farmers. Since the contribution relates to the output marketed, conflicts over cost sharing have not been an issue in MahaGrapes.

In terms of risk mitigation, the MahaGrapes farmer bears the entire risk in production and marketing. However, the level of risk itself is lower to the extent that the cooperative provides technical expertise so that the crop can be saved from damage and satisfies the quality norms.

Thus, unlike in a situation where the farmer sells to intermediaries who bear the entire marketing risk (from rejection of the assignment), here the risk is shared across all farmers. The firm itself covers against such risks by rejecting procurements that do not meet the specifications but once they accept the produce from the farmer, the risk is totally borne by the firm where everyone owns a share.

MahaGrapes stands out as an encouraging example of public-private partnership that has delivered favourable outcomes for both large and small farmers. Ownership of MahaGrapes lies solely in the hands of farmers; as they have collectively contributed their share in the fixed and operating costs of MahaGrapes and they also handle the governance of the firm. However, the State initiative from institutions such as MSAMB was essential.

With assistance from a spectrum of government bodies, the government assumed the role of a mere facilitator. In contrast to the system of other cooperatives in India (in dairy and sugar for example), the government was not assigned any direct role in the decision-making processes of MahaGrapes.

Infrastructure provision – MahaGrapes with partial financial aid from the State government and partial self-finance have installed pre-coolers and cold storages at all the 16 cooperative headquarters. The pre cooler technology was imported from California and helps to cool the grapes to one degree centigrade. This, by removing the heat from the grapes, extends its storage life to up to three months. After being pre-cooled, the grapes are stored in the adjacent cold stores and then carried in refrigerated trucks to the port. A nominal part of the price / Kg received by the MahaGrapes farmers namely Rs. 4 goes to fund the activities and pay for the costs of running the MahaGrapes firm and paying salaries to its employees. An additional Rs. 7 is charged for the cooling, and the charge on

storage facilities provided at the cooperative headquarters goes to the cooperative fund.

Amalsad and Gadat Co-operatives in South Gujarat

The Amalsad co-operative was registered in 1941. It has a membership of more than 8000 of which about 50% are active members. Out of the total business of about Rs. 8.5 crore for various fruits, chickoo dominates the scene with as much sales as Rs. 7 crore from the crop. Mango, a major contributor once upon a time, has been reduced to just Rs. 60 lakh, and banana has almost disappeared. In fact, paddy has acquired somewhat an important place in business of the co-operative with sales contribution of Rs. 90 lakh. The decline in relative as well as absolute share of mango is attributed to the uncertainty of crop, fluctuations in its price and short season, which have led to area shift away from mango in favour of chickoo and paddy in the South Gujarat belt.

Similarly, the Gadat co-operative, registered in 1944, has 3152 members of whom about 1800 are active members. The co-operative covers 800 hectares across 7 villages. Like Amalsad, it has chickoo as its main business though banana and mango are also procured. Out of a turnover of Rs. 4.075 crore, chickoo accounts for as much as Rs. 4 crore. It also has tried selling mango pulp under the brand names of 'Tripti' and 'Amidhara'.

In Amalsad co-operative, every day about 200 farmer members bring graded produce to the society at its two collection centres, one of which is at Amalsad itself. The grading is done on the basis of size, shape and fitness of the fruits. A sample of 10-kg. of chickoo from a lot is drawn in order to judge the quality. The number of fruits in the sample lot size determines the quality. The lesser the number of fruits, the better grade of quality is awarded to that lot. The system is known locally as 'Jantri' count. These quality and grade parameters are fixed for the season and can be changed from season to season or during the season itself depending on the behaviour of and price realization in terminal markets, agro-climatic situation, and general levels of quality in a season.

In the Gadat co-operative, grading is done in such a fashion that every 5 fruits more per 10 kgs. of chickoo will lead to a Rs. 0.70 cut in price per kg. This leads to the entire pooled produce being graded into three types – A, B and C. For procurement from member within each grade, penalty for more number of fruits per 10 kg. pack is imposed. The minimum number of fruits (chickoo) in a 10 kg. pack could be 90 (A grade) and maximum 250 (C grade).

The Amalsad co-operative has two types of members – 'A' grade and 'B' grade. It has its own shop (outlet) in each village to cater to the needs of the members in 17 villages, which have a population of the order of 35,000.

Similarly, in the Gadat co-operative area, each village has a retail outlet of the co-operative along with a flour mill. This outlet supplies various agricultural inputs as well as consumer goods to farmer members. Besides, there is a rice mill owned by the co-operative and it sells rice under the brand name of "Ambica". In the Gadat co-operative, the produce is pooled after the farmer has been paid up to 75 percent of the value of his produce as per the grade of the produce.

The Amalsad co-operative works through the commission agents to dispose of the produce in markets like Delhi, Bombay, Indore, etc. In fact, Delhi alone accounts for 90 percent of the total chickoo sales of the co-operative. Amalsad co-operative works in a highly competitive market. There are more than 10 private traders in the Amalsad market. But the co-operative accounts for 50 per cent of the total market arrivals of fruits, and 95 percent of the produce from the 17 villages, which are catered to by the co-operative. The co-operative has its own chickoo packaging machine, worth Rs. 14 lakh, which is used to pack and load chickoo in trucks mechanically. Besides, the co-operative is also in the business of cleaning, packing, branding, and selling various food commodities at its main complex and through its various outlets.

In the case of Gadat, mango is sold to an American Dry Fruit Company (60 percent) as well as in the fresh fruit retail market (40 per cent) through its own outlets, which are located in Ahmedabad and Surat (2 each). Chickoo is sent to distant markets like Delhi as in the case of Amalsad. In fact, the co-operative is also planning to sell chickoo through retail outlets. Major factor in efficient marketing management in these co-operatives is the use of market information in decision-making. They are equipped with various modes of communication and are in constant touch with the relevant markets and buyers.

One more feature of these co-operatives is that the membership does not come as a free option for the members. The members are expected to deliver produce to the co-operative and loyalty is valued. In fact, in order to keep the co-operative viable and manageable, the Gadat co-operative is planning to close its membership. The limited membership may not be in tune with the principles of co-operation, but it is crucial for the financial health of the co-operative. In fact, this has been one of the factors in ensuring viable functioning of the so called "New Generation Co-operatives" in the US and of the sugar co-operatives in South Gujarat along with other factors like value added processing, linking of producer equity and product delivery rights, sale of tradable equity shares to raise capital and efficient use of market information.

HOPCOMS, Bangalore

The present HOPCOMS was established as 'The Bangalore Grape Growers' Cooperative Marketing and Processing Society Ltd.' (BGGCOMS) on 10th September, 1959 with the main objective of encouraging grape vine

cultivation by providing the required inputs, technical know-how, marketing facilities etc. The society started handling fruits and vegetables apart from grapes from the 1965. In 1983, the name of the society was changed as 'The Bangalore Horticultural Producers' Cooperative Marketing and Processing Society Ltd. (BHOPCOMS) and subsequently in 1987 it became HOPCOMS.

The membership of the society consists of four categories viz. 'A' class members, who are the producers of horticultural crops in the area of operation; 'B' class members, who are admitted as associate members and include cooperative institutions; 'C' class earmarked for the Government of Karnataka; and 'D' class members comprise traders and commission agents.

The society is authorized to raise share capital worth Rs. 10 crore by issuing 4.9 lakh shares to 'A' class, 10,000 shares to 'B' class and 5 lakh shares to the Government. Each share is valued at Rs.100/-.

The jurisdiction of the society extends to 8 districts of Karnataka, namely Bangalore (both rural and urban), Mysore, Dakshina Kannada, Kolar, Mandya, Tumkur and Shimoga. The society has one branch each in 6 districts barring Shimoga and Bangalore (Rural).

HOPCOMS is run under the guidance of the Department of Horticulture and is managed by a Board of Management consisting of 15 members-11 elected from 'A' class and 4 Government nominees. The director of Horticulture is Ex-Officio President of the society. The main business of HOPCOMS is procuring and disposal of fresh fruits and vegetables.

1. Procurement of Fruits and Vegetables

The society procures fruits and vegetables, both from cultivators (members as well as non-members) and the open market, as discussed below:

(i) Supply from Cultivators

- (a) Supply at the Head Office/Branch: Producers at the nearby places bring their produce on their own and supply at the H.O. or at the branches. The cultivator has to take an indent from the society for the supply of fruits and vegetables and, normally, produce in excess of the indented quantity will not be accepted.
- (b) Supply at the Procurement Centres: During 1970s, the society was procuring hardly 35 to 40 percent of fruits and vegetables from the field. However, in 80s, there was a change in the policy of HOPCOMS in favour of field procurement, and with the help of the procurement centres, at present, the society purchases nearly 85 percent of fruits and vegetables from the cultivators directly. Almost entire quantity of

tomato, cabbage, cauliflower, cucumber, raw banana, pomegranate, papaya and mango is now being procured from the field.

(ii) Procurement from the Market

A part of the produce is also bought from the local markets to meet the requirements of the bulk buyers like Government hospitals, hostels, factories etc. On an average, the society loses Rs. 3 per kg. of fruits and vegetables by purchasing from the market. It was observed that the policy of buying more from the market followed by the society in the 70s resulted in net losses to the society (Subramanyam et al., 1979). The society buys about 15-20 per cent of fruits and vegetables from the market. If this is also purchased from the members' field, then the society not only gains Rs. 3 per kg. in terms of price but also helps the producers in better marketing of their produce.

(iii) Supply from other States

In addition to procurement from producers and market, HOPCOMS gets a small quantity of the produce from other states too. It gets apple from NAFED, the Himachal Pradesh Horticultural Produce Marketing and Processing Corporation (HPMC), National Dairy Development Board (NDDB) and GROWREP, Delhi, kinnow orange from GROWREP, orange from NAFED, Nasik and onion from Vegetable and Fruit Cooperative Marketing society (VEFCO), Nasik. The procurement of fruits and vegetables is made on consignment basis.

(iv) Grading of Fruits and Vegetables

Though HOPCOMS does not classify fruits and vegetables into grades like A, B, and C, the society claims that it maintains the quality of fruits and vegetables by accepting only the good quality produce from the growers. It rejects the injured, damaged and the diseased.

(v) Indent System

It is understood that the society follows the 'indent system', which it used to follow even in the 70s, while procuring fruits and vegetables from the growers. This system, no doubt, helps the society in regulating the supply based on the demand. In fact, it is understood that the disposal of the produce is the major problem of the society and, hence, in order to avoid losses due to surplus, HOPCOMS resorts to this system.

2. Disposal of the Produce - Sales through Retail Outlets

HOPCOMS has a good network of 256 retail outlets spread over 8 districts. The salesmen of the society who get a commission of 3.7 per cent from the society run these outlets. The H.O. Bangalore sold about 71 percent of vegetables and 79 percent of fruits through these retail outlets. Further, about 80 percent of vegetables like cowpea, bhendi, knolkhol and tondekai (coccinea) and over 60 percent of tomato and brinjal were sold through these retail outlets. As regards fruits, around 95 percent of sapota, papaya, pomegranate, pineapple and banana (yelakki) and over 65 percent of orange, grape and banana reached the consumers through these outlets. It may also be observed that HOPCOMS gets higher price for fruits and slightly less for vegetables when they are sold in these outlets.

Sales to Bulk Buyers:-

HOPCOMS sells fruits and vegetables on bulk basis to certain 'Institutions' like Government hospitals, hostels, and factories and also to processors like KISSAN and Karnataka Agro Fruits. Normally, HOPCOMS supplies fruits and vegetables on credit basis and the records reveal that it charges 40-50 paise more per kg. of vegetables than the stall price when vegetables are sold to the factories. In case of processors, transport cost is added to the price of the vegetables. This, perhaps, is the reason for the higher price HOPCOMS gets for vegetables like tomato, bhendi, cucumber, onion etc. when it sells them to the bulk consumers. This portends that HOPCOMS can think of increasing their sales of vegetables by having contractual arrangements with these bulk consumers.

Sales to HOPCOMS Branches:-

The society sends fruits and vegetables to its branches to be sold through their retail outlets. About 40 percent of fruits and vegetables procured by the branch come from the Head Office. However, it is felt that the branches of HOPCOMS, instead of acting as mere distribution centres, should function as independent units of fruit and vegetable growers of the respective district. In order to help the fruit and vegetable growers, unlike the Mangalore branch (which has not enrolled any producers as its members even after 5 years of its existence), membership enrolment drive should gain momentum in the branches. They can procure the produce from their members and sell them through retail outlets.

3. Production Related Activities

HOPCOMS supplies production requisites like vegetables seeds, fertilizers, PPC (fungicides and insecticides) and garden implements to the fruits and vegetables growers at reasonable price. It may be observed that inputs

account for 8-10 percent of the total sales of HOPCOMS. Further, it is also to be noted that there has been a 3-fold increase in the value of inputs supplied to the fruits and vegetables growers. This is perhaps due to the opening up of the fertilizer and PPC godowns at Kolar, Chikkaballapur and Vijayapur.

4. Process Activity

HOPCOMS carries out preparation of juice from grapes, mango, orange, apple etc., in Bangalore, Mysore and Mangalore branches and sells it in bottles of 200 ml in their retail outlets. Although, with the opening up of the procurement centres, there is an increase in the supply of fruits, a corresponding increase is not observed in their processing and juice sales. These account for hardly 1 percent of the total sales of HOPCOMS, as specific efforts are not made either in the juice preparation or its sales. Juice has been fetching a higher margin than any other activities of the society. This is to suggest that it is profitable to take up processing of fruits on a large scale and concurrent improvements need to be made for the marketing of the processed products.

Self Help Groups in Andhra Pradesh – a case study

1. The success story of women empowerment in Andhra Pradesh, through Self Help Groups (SHGs) and MACTCS (Mutually Aided Co-operative Thrift and Credit Societies), has been widely appreciated across India.
2. Over 5.4 million women have organized themselves in 380 thousand groups.
3. Farmers' Groups have also been formed in the state to facilitate implementation of participatory projects at grass-roots level.
4. These village level organizations of the farmers and farm families have grown to a level of self-sustainability where they are now demanding more and more access to Information. They are demanding Information on public sector schemes, market prices, weather etc.
5. They market their products collectively to obtain more bargaining power.
6. Under *Mission Mode NATP Empowerment of women in agriculture*, 540 farm women were grouped into 36 SHGs for starting different enterprises based on the needs and preference of farm women, resources available and marketing potential in the area.
7. Trainings were organized for capacity building of farm women of the SHGs in the enterprises.
8. The members of SHGs were also trained to handle different equipments.
9. Empowerment of women SHGs have been made by skill training and orientation to project management aspects.
10. All the members of SHGs started enterprises as per their interest. The women have started generating income from enterprises.

4. CONTRACT FARMING IN INDIA

The new market realities due to focus on liberalization, privatisation and globalisation of the post-WTO regime are here to stay, bringing in its wake new opportunities and challenges as well. The agriculture sector, like any other sector of the economy, has got to put its act together to evolve a response mechanism to face this ineluctable reality. This may call for a paradigm shift in its focus and approach. Introduction of reforms in agricultural marketing is the need of the hour to bring the requisite changes in its structure and to push the sector to take off from its low growth rate of 2-3% to at least a respectable 4-5%. In this context some reforms have already been initiated, while some others are in the offing. However, the blitzkrieg of reforms for growth should in no way be allowed to push the interests of the millions of small and marginal farmers to the background. Against this backdrop, contract farming is billed to be a veritable instrument to address many of the traditional ills affecting the agriculture sector and the farmers, such as fragmentation of holdings, long chain of market intermediaries, ignorance about the requirements of the buyers, low farm mechanization, inadequacy of capital and distress sale and consequent heavy losses to farmers etc.

Contract farming is an exciting way of giving the power of scale to the small farmers, of marrying the small farmer efficiency to the scale economy, transferring corporate management skills to the agriculture field, providing assured markets for the produce, reducing the transaction costs involved in the value chains of the commodities and of ensuring vertical integration through forward and backward linkages.

Contract farming system: -

Definition: Contract farming arrangements of different types have existed in various parts of the country for centuries for both subsistence and commercial crops. The commercial crops like sugarcane, cotton, tea, coffee etc. have always involved some forms of contract farming or the other. Even in the case of some fruit crops and fisheries, contract farming arrangements, involving mainly the forward trading of commodities have been observed. However, in the wake of economic liberalization, the concept of contract farming in which national or multinational companies enter into contracts for marketing of the horticultural produce and also provide technologies and capital to contract farmers has gained importance. Contract farming is generally defined as farming under an agreement between farmers and a sponsor (processing and/or marketing firm) for the production and supply of agricultural products under forward agreements, frequently at predetermined prices. Within this broad framework, there are different variants of contracts depending on the intensity of contractual arrangements. The basis of such arrangements is a commitment on the part of the farmer to provide a specific commodity in quantities and at quality standards determined by the purchaser and a commitment on the part of the sponsor to

support the farmer's production and to purchase the commodity. Thus, under contract farming, the farmers grow selected crops under a buy back agreement with an agency called sponsor engaged in trading or processing and the latter contributes directly to the management of the farm through input supply including planting materials as well as technical guidance through intermittent crop supervision and also markets for the produce. Thus, the farmer assumes the production related risks, and the price risk is transferred to the company. In some cases, the company also bears the production risk, depending on the stage of crop growth at which the contract is made. If the contract is made at flowering or fruiting stage, the company bears the production risks also. It is this variant of contract farming which is said to be one of the ways by which small farmers can participate in the production of high value crops like fruits, vegetables, flowers etc. and benefit from market-led growth.

Variations of contracts:-The intensity of the contractual arrangement varies according to the depth and complexity of the provisions in each of the following three areas:

- **Market provision:** The grower and the buyer agree to terms and conditions for the future sale and purchase of a crop or livestock product. These conditions often specify price, quality, quantity and timing etc.;
- **Resource provision:** In conjunction with the marketing arrangements, the buyer agrees to supply selected inputs, extension of credit, land preparation and technical advice covering production practices, quality and standardization of the crop etc. These conditions directly shape and regulate the production and labour processes of the grower;
- **Management specifications:** The grower agrees to follow recommended production methods, inputs regime, and cultivation and harvesting specifications.

Crops suitable for contract farming:-

In general contracting is practiced by companies in case of crops that are:

- **Perishable:** cannot be stored for long periods and needs to find market immediately
- **Bulky:** and, therefore, costlier to transport
- **Plantation crops:** growers cannot abandon the plantations or the estates and are locked into relationship with processor
- **Processible:** need for processing-based inter-dependence between growers and processors which can be explored
- **Variations in quality:** where crops vary in quality and quality is important for processing
- **Unfamiliar:** medicinal plants like *safed musli*, *ashwagandha* etc. and new products for new markets like gherkins etc.

Models of contract farming:- There are five models of contract farming namely, the centralized model, the nucleus estate model, the multipartite model, the informal model, and the intermediary model that are in vogue in the country. A sponsor decides to follow a model depending on the market demand, production and processing requirements and economic and social viability of the farmers.

- In a **centralized model** a sponsor (a processor/packer) buys from a large number of small farmers. It is vertically coordinated with quota allocation and tight quality control. It is used for tree crops, annual crops, poultry, dairy etc., and products often requiring high degree of processing, such as tea or vegetables for canning or freezing. The model is also useful for products where market requirements necessitate frequent changes in the farm technology with fairly intensive farm-level support from the sponsor. Sponsor's involvement in production varies from minimal input provision to the opposite extreme where the sponsor takes control of most of the production aspects.
- **Nucleus estate model** is a variation of the centralized model where the sponsor also manages a central estate or plantation. The central estate is usually used to guarantee throughput for the processing plant but is sometimes used only for research or breeding purposes. The sponsor provides significant amount of material and management inputs under the model. The model is appropriate for crops such as tea, sugar and oil palm with which farmers may have had little or no experience. Such crops require significant long-term investment and generally immediate processing after the harvest.
- **The multipartite model** may involve a variety of organizations, frequently including statutory bodies. This model can develop from the centralized or nucleus estate model, eg: through the organization of farmers into cooperatives, or the involvement of a financial institution.
- **The informal model** is characterized by individual entrepreneurs or small companies. It involves informal production contracts, usually on a seasonal basis. It often requires government support services such as research and extension.
- **The intermediary model** involves sponsor in subcontracting linkages of farmers with intermediaries. There is a risk of the sponsor losing control of production and quality as well as prices received by farmers.
- All the above models are very much adopted by different sponsors for different commodities. The National Institute of Agricultural Marketing (NIAM), in its recent study (2004) on contract farming covering Karnataka, Madhya Pradesh, Punjab and Tamil Nadu, has identified four types of

contract farming model in these states **in terms of the different entities involved** in a contract. The various types of contracts are:

- **Type-I**-involving none other than the contracted farmers and the sponsoring firms mainly providing the planting materials to the farmers. The extension wing of the procuring wing of the company takes care of the registration and other issues of pre-production and production. As there is no credit facility given by the sponsor, there is a risk of farmers running into the hands money lenders. Some of the Companies following this model are Nijjer Agro (Tomato and Chilly in Punjab), Tinna Oils (Soya bean in Maharashtra), SNC Oil (for Dhavana in karnataka), Himalayan Drugs Private Ltd. (Ashwagandha, Karnataka), Pepsico (Basmati, Punjab) etc.;
- **Type II**-This is a three-tier model involving the sponsor, the farmers and an implementing agency which could be a public or a private body or a local NGO. The implementing agency conducts contract farming with a set of quality specifications and guidelines set by the corporate, which is the ultimate buyer. The implementing agency conveys the contracted price as agreed by the purchaser of the commodity under contract to the farmers. The implementing agency may charge some minor share of the value of the produce from the buyer and from the farmers as an extension charge. “Ion Exchange Enviro Farms” is following this model in Maharashtra for contract farming of organic produce.
- **Type III**- The model is similar to type-II as it has three tiers and a traditional channel member like artiya replaces the middle tier. These channel members help the corporates in identifying the farmers, arranging for the cleaning and grading of the produce and also procuring the produce. At the same time, the company is in direct contact with the farmers for provision of extension services. The model provides transparency but provides ample scope for the arthiyas to cut corners for their benefits. The companies that adopt this model are United Breweries Limited (Barley, Punjab),ITC-IBD (Soya bean, wheat in Madhya Pradesh) etc.
- **Type-IV**- This model is the most elaborate model, under which all the services are provided under a single umbrella. The implementing agency in this model, which could be an independent corporate or an arm of the buying company, coordinates with all the agencies such as seed companies, input providers, banks and insurance providers for providing a plethora of services under the same roof. The implementing agency renders its services for a nominal fee from the farmers for extension services and a meagre share of 0.5% to 1% share on the interest received by the bank and the value of the produce purchased by the buyer. The companies adopting this model are Mahindra Subhlabh

Services Ltd. (Basmati, Non-basmati, Maize - in Punjab & Tamil Nadu), Escorts Machinery Group (Basmati in Punjab), Super Spinning Mills (Cotton in Tamil Nadu), Cargill India Pvt. Ltd (Soya bean, wheat, maize in Madhya Pradesh and U.P), Appachi Cotton India (Cotton in Tamil Nadu), Gherkin exporters (Gherkin in Karnataka, Tamil Nadu & Andhra Pradesh)

5. GRADING AND STANDARDIZATION OF AGRICOMMODITIES

The quality of agricultural products brought to the market by the producer-farmers over time and over regions varies considerably from lot to lot. It is essential to grade the produce on scientific lines in order to remove these variations and also for fetching good prices for the produce marketed in different markets. Scientific grading should be based on objective evaluation of quality aspects so that the sellers could be able to describe the quality that they are offering and the buyers should understand what is being offered to them in the market. In view of this, efforts have been made to organize the marketing of agricultural commodities on scientific lines after the enactment of The Agricultural Produce (Grading and Marking) Act, 1937. This Act empowers the Central Government to prescribe grade standards for agricultural commodities and livestock products and stipulate conditions governing the use of grade standards and lay down the procedure for grading. At present, there are 212 agricultural commodities for which grade standards are available. Graded agricultural produce in India bear the AGMARK label. The different colour AGMARK labels indicate different grades of the product. The AGMARK label is indicator of purity and quality of the product. It ensures consumers protection. Agmarking exists in the country for the purpose of

- (i) Domestic consumption of agricultural commodities;
- (ii) Export of agricultural commodities;
- (iii) Agmarking at producer's level.

Grading and standardization:

Grading and standardization is a marketing function, which facilitates the movement of produce. Without standardization there is confusion and unfairness as well. Standardization is a term used in a broader sense. Grade standards for commodities are laid down first and then the commodities are sorted out according to the accepted standards. The products are graded according to quality specifications. But if these quality specifications vary from seller to seller, there would be a lot of confusion about its grade. The top grade of one seller may be inferior to the second grade of another. This is when buyers lose confidence in grading. To avoid this eventuality, it is necessary to have fixed grade standards, which are universally accepted and followed by all in the trade.

“Standardization is determination of the standards to be established for different commodities. The standardization can be defined as the determination of the basic limits on grades or the establishment of model processes and methods of producing, handling and selling goods and services.”

Standards are established on the basis of certain characteristics-such as weight, size, colour, appearance, texture, moisture content, staple length amount of foreign matter, ripeness, sweetness, taste, chemical content, etc. termed grade standards. Thus, standardization means making the quality specifications of the grades uniform among buyers and sellers over space and time.

Grading can be defined as the sorting of the unlike lots of the produce into different lots according to the quality specifications laid down. Each lot has substantially the same characteristics in so far as quality is concerned. It is a method of dividing products into certain groups or lots in accordance with predetermined standards. Grading follows standardization. It is a sub-function of standardization.

Type of Grading:-

Fixed Grading/Mandatory Grading–Sorting out according to size, quality & other characteristics, which are fixed.

- (i) Permissive / valuable grading: standards vary over time.
- (ii) Contrived / de-centralized grading – the packer either sets up his own lab-approved grading lots set by purpose.
- (iii) Grading of producers' level:- Under this programme, free grading services are provided in market yards to farmers for sorting the produce before offering for sale.

CRITERIA FOR GRADE STANDARDS

The criteria, which determine the adequacy of standards, are:

- (i) Standards should be built on the characteristics, which the users consider important, and these characteristics should be easily recognizable. More weightage should be given to the users' opinion.
- (ii) Grade standards should be built on those factors, which can be accurately and uniformly measured and interpreted. The grade standards based on subjective measurement will be difficult to apply uniformly, particularly by different graders and factors, which will reduce the usefulness of the grade itself.
- (iii) The grade standards terminology should be uniform at all levels of the marketing channel.
- (iv) The cost of operating the grading system must be reasonable.

The best practical test of the adequacy of grade standards is their acceptance and use by practical test of the adequacy of grades that are widely used; it means they are fairly adequate and meaningful; but, if the large segment of the market functionaries does not use the standards, it may be assumed that some of the criteria that satisfy the consumers have not been adequately met.

Advantages of Grading:

The advantages available to producers and consumers due to the adoption of grading are:

- (i) Grading facilitates marketing, as consumers are well aware about the grade designations of different products, so that sellers do not have to make much effort to convince the buyers about the quality of the product.
- (ii) Grading widens the market for the product as buying and selling of graded products can take place between the parties located at distant places without physical inspection of the product.
- (iii) Grading reduces the cost of marketing by minimization of expenses on advertisement, costs due to storage losses, costs on account of personal inspection, etc.
- (iv) Grading enables producers to get higher prices for good quality produce, as most consumers prefer buying of better quality products at higher prices.
- (v) Grading helps in performance of various market operations such as better packaging, pooling of produce, improving of keeping quality of the produce and in claim-settlement from a transport agency in case of occurrence of damages during the process of movement etc.
- (vi) Grading helps the consumers in getting quality products at fair prices and hence minimize the purchasing risk of the consumers.
- (vii) Grading increases pricing efficiency through creation of better market competition etc.

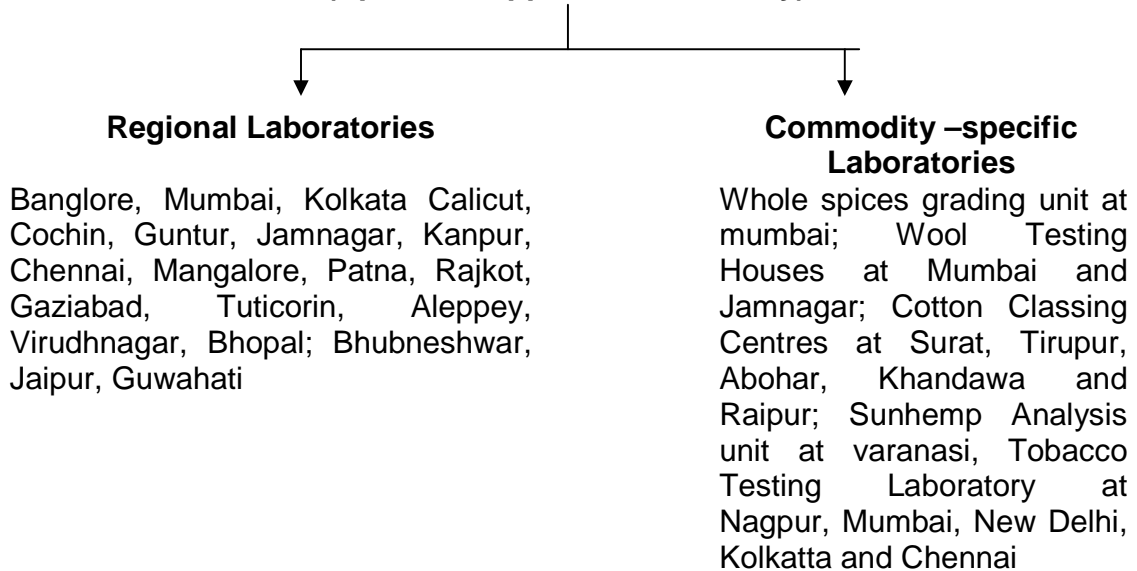
Inspection and Quality Control

To ensure the confidence of consumers, it is essential that grading is done in accordance with the standards that have been laid down. For this purpose, the inspection of the goods at regular intervals by a third party is essential.

Inspection involves the testing of the graded goods with a view to determining whether they conform to the prescribed standards. It ensures quality control. For purposes of inspection, samples of the product are drawn at various stages- from the manufacturers, the market middlemen or the consumers at their doorsteps – and are tested in the laboratory. Inspectors appointed by the government, and not by a producer or a buyer, carry out these inspections.

The network of Agmark laboratories in the country is shown below:

**Central Agmark Laboratory, Nagpur
(Apex and Appellate Laboratory)**



Regular inspection creates confidence among the buyers. Producers too know that there is someone who checks the standards of the produce graded by them. This avoids the temptation of adopting malpractices in the grading such as mixing of inferior grade produce, etc. After laboratory tests, if the produce is found to be below standards, the license of the grader is cancelled and legal action is initiated against him.

Labeling

The graded products, according to the standards fixed by the Agricultural Marketing Advisor, Government of India, bear the label 'AGMARK'. AGMARK is the abbreviation of Agricultural Marketing. It is a quality certification mark under the Agricultural Produce (Grading and Marking) Act, 1937. This label indicates the purity and quality of the product on the basis of the standards that have been laid down. The Labels of different colours are used to indicate the grade of the product. The AGMARK labels are printed on special quality paper and issued to the packer who is required to maintain the account of the labels, which are issued to the grader, in a register. It is a voluntary scheme. Interested traders and manufacturers are given license to grade their products under AGMARK quality certification mark.

AGMARK label is attached to the container of the product in such a way that it will not be possible to remove the contents of the packages without tampering the AGMARK labels. Each AGMARK package bears the date of packing and date of expiry of the product. AGMARK products are pre-tested and certified for their quality. AGMARK products are of assured quality and different

from adulterated and spurious goods. If any AGMARK product purchased by the consumer is found defective, the consumer gets the products replaced or gets the money back as per the procedure laid out.

The grading can be popularized by:

- (i) Creating awareness about advantages of Agmark-graded products among the consumers of the country by mass media advertisement.
- (ii) Educating the producers about the economic benefits of selling graded products over non-graded products.
- (iii) Introduction of compulsion in grading especially grounded spices, edible oils, ghee, honey, wheat flour etc. in internal market along side the foreign market.
- (iv) Taking steps for removing the problems, which have discouraged the producers for adopting grading and the consumers for preferring to buy graded products.
- (v) Encouraging the farmers and the other entrepreneurs to avail the subsidy available under the Infrastructure Scheme of Government of India to set up grading and packing units.

The National Commission on Agriculture (NCA) had made the following suggestions to make grading and standardization popular in the country:

- (i) Grading and standardization have to be made compulsory for transactions in agricultural commodities at all levels for local, interstate and export trade.
- (ii) Grading and standardization must cover all types of agricultural commodities, viz., crops, including horticultural and plantation crops, livestock and livestock products, fish and fish products, and minor forest products. Grade standards should be formulated for the commodities, which have not been covered so far.
- (iii) The duplication and overlapping of functions linked with the formulation of grades and grade standards for agricultural commodities must be done away with. Only one authority should be entrusted with the function of formulating grade standards instead of the present practice of formulation of different grade standards by different authorities for the same product, which include the Health Ministry, the Bureau of Indian standards and the Directorate of Marketing and Inspection
- (iv) The work should be distributed between the central and State Government departments to avoid duplication. The authority to enforce grading at the interstate level and for the export trade should be vested in the Directorate of Marketing and Inspection, Government of India, and for internal trade in raw, semi-processed and processed in the State Marketing Department.
- (v) Samples of graded commodities should be displayed in all the markets for verification, both by graders and participating consumers.

- (vi) The grading system should be made efficient and foolproof. For this purpose, trained and well-qualified graders should be appointed, and they should be unconnected with either buyers or sellers.

International Organization for Standardization

International organization for standardization (ISO) and the Codex Alimentarius Commission (CAC) are the two prominent international organizations engaged in standardization of agricultural products.

International organization for standardization (ISO) came into existence formally on 25th February 1947. The objective of ISO is to promote the development of standards in the world with a view to facilitating international exchange of goods and services and to develop cooperation in the spheres of intellectual, scientific, technological and economic activities. At present, 89 countries are members of ISO and 117 countries are corresponding members. India is a founder member of ISO. The ISO is presently engaged in the formulation of standards for a large number of agricultural commodities, covering spices and condiments, lac, essential oils, cereals and pulses, food products and stimulant foods. The results of ISO technical work are published as international standards (ISO standards). This work is carried out by a setup of 191 technical committees covering different committees (ISO/TC 34) that deals with agricultural food products. This technical committee had 15 sub-committees dealing with various food committee groups such as fruits and vegetables; milk and milk products; meat and meat products; and spices and condiments. The sub-committees have participating members, observer members and liaison members. The ISO –9000 is a series of international standards for a quality oriented system and is applicable both to manufacturer and service industry.

The Food and Agriculture Organization (FAO) of the United Nations and the World Health Organization established the Codex Alimentarius Commission (CAC) in 1963. The CAC establishes food standards, which are termed as codex alimentarius. The words 'codex alimentarius' in Latin mean food law or food code. The primary objective of the commission is to offer protection to consumers and facilitate world trade by establishing uniform international standards. The codex standards can play a vital role in every aspect of food security system, i.e., production, storage and transportation. These standards include guidelines, code of practices and other advisory provisions that aim at promoting the purpose of these standards. At present, there are 144 countries as members of this commission. The establishment of the international food standards under CAC is a long-drawn process. The commission appoints subsidiary bodies or committees to prepare preliminary proposed draft standards. The standards so formulated are circulated to all member countries for getting their comments. Finally, the draft standards are circulated for implementation. The commission meets periodically to review these standards.

Group-wise List of the Commodities for AGMARK Grade Standards:

Sl. No.	Name of the Group	No. of commodities
1.	Food Grains & other products	30
2.	Fruit & Vegetables	51
3.	Spices and Condiments	26
4.	Edible Nuts	08
5.	Oil Seeds	17
6.	Vegetable Oils & tab	19
7.	Oil Cakes	08
8.	Essential Oils	08
9.	Fiber Crops	05
10.	Live stock, Dairy & Poultry products	10
11.	Other Products	30
Total		212

Mechanics of Grading:

A commodity to be marked with AGMARK label is subjected to various (physical, sensory and chemical) tests to establish its purity and quality. For this, the following procedure is commonly adopted in grading of different commodities:

Drawing a representative sample from the lot of commodity.

A representative sample from the lot of the commodity, to be graded, is taken as under:

- (a) In case of liquids, about half kg or so quantity of the commodity is taken from the homogenized lot.
- (b) In case of grains (seeds) packed in bags, sample is taken with a wooden or metallic shovel or by mechanical triers.
- (c) In case of fruits, few pieces are picked up randomly from the heap of fruits.

Analysis of the sample:

The sample so drawn above is analysed as under:

- (a) The commodity is examined for defects and blemishes by inspection.
- (b) The presence of extraneous matter, produce of other variety, damaged produce, moisture etc., is determined in percentage terms.

Different laboratory tests as per requirements of the commodity are carried out in ghee, oils and other products

6. PACKAGING OF FRUITS, VEGETABLES AND ROOT CROPS

Packaging is the first function performed in the marketing of agriculture commodities. It is required for nearly all farm products at every stage of marketing process. The type of the container used in the packing of commodities varies with the type of commodity as well as with the stage of marketing.

Packing means wrapping and crating of goods before they are transported. Goods have to be packed either to preserve them or for delivery to buyers. Packaging is a part of packing which means placing the good in small packages like bags, boxes, bottles or parcels for sale to the ultimate consumers. In other words, it means putting goods on the market in the size and pack, which are convenient for the buyers.

Why packaging is necessary

Most fresh produce ready for market is composed of large numbers of small units of similar size, which must be moved in amounts to be conveniently handled by one person. This is best achieved by using containers of capacities from 3 to 25 kg, up to dimensions of about 60 x 40 x 30 cm. Some commodities (e.g. potatoes) may be marketed in 25 or 50 kg sacks, and other large items, such as whole bunches of bananas, are moved without packaging. Leafy vegetables can be sold loose or tied in bundles and not packaged.

Most developing countries use traditional baskets, sacks and trays to carry produce to markets. These are usually of low cost, made from readily available materials such as dried grass, palm leaves or bamboo. They serve the purpose for fresh produce carried over short distances, but they have many disadvantages in big loads carried long distances.

Large commercial quantities of produce need better packaging in order to minimize losses and achieve the most economical use of transport. The aim is to protect the produce from damage in handling, transport and storage and to provide easily handled and counted containers of uniform size.

Packages of standard size can reduce the need for repeated weighing and can facilitate handling, stacking and loading. A wide variety of package types is fabricated from paper and paper products (compressed cardboard and corrugated cardboard, called fibre board in some areas), wood and wood products (sawn timber and compressed chips) and plastics, both pliable and rigid. Each type must be considered in terms of its utility, cost and capacity to enhance the value of the produce.

Economy in packaging is always a desirable goal. A study in Thailand showed that a plastic crate, while costing five times as much as a traditional bamboo basket of similar capacity, was still useful after 20 times the number of

journeys, putting the cost per journey of the plastic crate at about one-quarter of that of the bamboo basket. The crate also provided better protection of produce, easier handling and better stowing, and was easier to clean.

Perhaps improvements in the design and construction of indigenous containers might, in the context of the small-scale grower, prove to be a better solution than buying plastic crates.

Damage suffered by packaged produce

From injuries

➤ *Cuts or punctures*

Cause: sharp objects piercing package; splinters in bamboo or wooden containers; staples or nails protruding in containers;

Effect: deep punctures or cuts in produce, leading to water loss and rapid decay

➤ *Impact (shock)*

Cause: throwing or dropping of packages; sudden starting or stopping of vehicle, causing load movement; speeding vehicle on rough road;

Effect: bursting of packaging, bruising of contents

➤ *Compression (squeezing or squashing)*

Cause: flimsy or oversized containers; containers overfilled or stacked too high or both; collapse of stacked containers during transport;

Effect: bruising or crushing of contents

➤ *Vibration (shaking)*

Cause: vibration of the vehicle itself and from rough roads;

Effect: wooden boxes come apart, damaging produce

From the environment

➤ *Heat damage*

Cause: exposure of packages to external heat, e.g. direct sunlight, or storage near heating system; natural buildup of internal heat of produce owing to poor ventilation within package, in storage or vehicle;

Effect: fruit becomes overripe or softens; produce wilts and develops off-flavours; decay develops rapidly; cardboard cartons may become dry and brittle, easily damaged on impact;

➤ *Chilling or freezing damage*

Cause: low or subzero ambient temperatures; exposure of sensitive produce to temperatures below chilling or freezing tolerance level during storage;

Effect: damage to chilling-sensitive produce; breakdown of frozen produce on thawing; plastic containers become brittle and may crack;

➤ *Moisture and free-water damage*

Cause: exposure to rain or high humidity; condensation on packages and produce moved from cold store to damp atmosphere at ambient temperature; packing wet produce in cardboard containers;

Effect: softening and collapse of stacked cardboard containers; squashing of produce in collapsed containers; decay promoted in damaged produce;

➤ *Damage from light*

Cause: plastic sacks and crates not treated with ultraviolet inhibitor will eventually break up when exposed to direct sunlight;

Effect: disintegration of plastic sacks damages produce when it is moved; fracturing of plastic crates can cut or bruise produce;

From other causes

➤ *Chemical contamination*

Cause: contamination of containers stored near chemicals; damage to produce by containers treated with preservatives, e.g. boxes made from wood treated with pentachlorophenol (PCP); contamination of produce from boxes affected by mould growth;

Effect: flavour contamination or surface damage and discoloration of produce in contact with container; decay of produce owing to contaminating moulds; wood-rotting moulds cause collapse of boxes;

➤ *Insect damage*

Cause: insects present in packed produce; wood-boring insects in wooden boxes;

Effect: consumer resistance and legal problems from presence of insects (e.g. spiders, cockroaches) in packed produce; spread of wood-destroying insects in infected boxes;

➤ *Human and animal damage*

Cause: contamination and eating by rodents and birds; pilfering by humans;

Effect: rejection of damaged produce by buyers or inspectors; loss of income through loss of produce.

The cost-effectiveness of packaging

The use of packaging represents an added cost in marketing and the price of the marketed product must take into account the capital outlay and unit-packaging cost as well as expected profit. To make an exact assessment of the added value is difficult because many factors may offset the cost of packaging, for example:

- losses should be significantly reduced;
- presentation and quality of the product may make it more desirable, a competitive advantage;
- marketable life of the produce may be extended.

It is clear, however, that packaging must not exceed the willingness of the market to accept the added value of the product, i.e. the extra cost involved.

Prevention of injuries to produce.

Suitable packages and handling techniques can reduce the amount of damage to which fresh produce is exposed during marketing:

- to keep the packaging itself from damaging produce during handling and transport, wooden boxes or cardboard cartons must be properly assembled; nails, staples and splinters are always a danger in wooden boxes;
- individual items of produce should be packed to avoid rubbing against each other during handling and transport; loose fill packs are particularly susceptible to vibration damage;

- bruising results from overfilling containers or from the collapse of boxes; collapse may be caused by weak walls of boxes, by the softening of cardboard walls because of moisture or by the failure to stack boxes so that the side and end walls support those above; stacks of boxes should never exceed the height that has been recommended by the maker;
- produce in woven jute sacks or nets is especially susceptible to shock damage; sacks of 25 or 50 kg capacity are normally used for relatively low-value produce, such as root and tuber crops, and are often roughly handled on account of their weight; where possible, handling of bagged produce should be minimized by stacking sacks in unit loads on pallets or in pallet boxes.

Effect of packaging on other types damage

- *Heat, chilling or freezing*

Packaging in general has poor insulating qualities and will have little effect on preventing damage from heat or cold. Lack of ventilation in packaging delays cooling and may contribute to high-temperature damage arising from heat generated by the produce itself. Recently developed expanded polystyrene packages have good insulating properties and are used, topped with ice, to transport vegetables with high respiration rates. The availability and cost of such packages make them inappropriate in most developing countries.

- *Moisture and free water damage*

High humidity and free water (e.g. rain) quickly weaken cardboard boxes, which get soggy and collapse when wet. This problem can be addressed during the manufacturing stage itself by waxing the cardboard or by facing it with moisture resistant plastic. Decay of produce packed in wet sacks or in wet wooden or cardboard boxes will be accelerated.

Chemical contamination

Packaging will not protect produce from contamination by outside sources of chemicals. The containers themselves become impregnated and contribute to the contamination.

Sacks and "knocked down" wooden or cardboard boxes awaiting assembly should not be stored in the same area as chemicals.

Selection of packaging for fresh produce

Packaging can be a major item of expense in produce marketing, so the selection of suitable containers for commercial-scale marketing requires careful consideration.

Besides providing a uniform-size package to protect the produce, there are other requirements for a container:

- it should be easily transported when empty and occupy less space than when full, e.g. plastic boxes which nest in each other when empty, collapsible cardboard boxes, fibre or paper or plastic sacks;
- it must be easy to assemble, fill and close either by hand or by use of a simple machine;
- it must provide adequate ventilation for contents during transport and storage;
- its capacity should be suited to market demands;
- its dimensions and design must be suited to the available transport in order to load neatly and firmly;
- it must be cost-effective in relation to the market value of the commodity for which used;
- it must be readily available, preferably from more than one supplier.

Size and shape of packages:

Packages should be of a size which can be easily handled and which are appropriate to the particular marketing system. The size should be no larger than is compatible with these requirements, especially with wooden boxes. The ratio of weight of the container to that of the produce it contains is important. Where transport charges are calculated on a weight basis, heavy packaging can contribute significantly to the final cost of the saleable product.

The shape of packages is also significant because of the loading factor: the way the load is positioned on the transport vehicle for maximum capacity and stability. Round baskets, whether cylindrical or tapered, hold considerably less produce than do boxes occupying the same space. A cylindrical basket contains only 78.5 percent by volume compared with a rectangular box occupying the same space.

The need for ventilation in packages:

Suitable packaging for any product will consider the need to keep the contents well ventilated to prevent the buildup of heat and carbon dioxide. The ventilation of produce in containers is a requirement at all stages of marketing, but particularly during transport and storage. Ventilation is necessary for each package, but there must also be an adequate air flow through stacked packages.

A tight stack pattern is acceptable only if packages are designed to allow air to circulate through each package and throughout the stack. Sacks and net bags must be stacked so that air can circulate through the contents. The effectiveness of ventilation during transport also depends upon the air passing through the load.

Packaging materials: Packaging for fresh produce is of several types:

Natural materials: Baskets and other traditional containers are made from bamboo, rattan, straw, palm leaves, etc. throughout the developing world. Both raw materials and labour costs are normally low, and if the containers are well made, they can be reused.

Disadvantages are:

- they are difficult to clean when contaminated with decay organisms;
- they lack rigidity and bend out of shape when stacked for long-distance transport;
- they load badly because of their shape;
- they cause pressure damage when tightly filled;
- they often have sharp edges or splinters causing cut and puncture damage.

Wood. Sawn wood is often used to make reusable boxes or crates, but less so recently because of cost. Veneers of various thickness are used to make lighter boxes and trays. Wooden boxes are rigid and reusable and, if made to a standard size, stack well on trucks.

Disadvantages are:

- they are difficult to clean adequately for multiple use;
- they are heavy and costly to transport;
- they often have sharp edges, splinters and protruding nails, requiring some form of liner to protect the contents.

Cardboard (sometimes called fibre board): Containers are made from solid or corrugated cardboard. The types closing with either fold over or telescopic (i.e. separate) tops are called boxes or cases. Shallower and open topped ones are called trays. Boxes are supplied in collapsed form, (i.e. flat) and are set up by the user. The setting-up and closing of boxes requires taping, gluing, stapling or the fixing of interlocking tabs. Cardboard boxes are lightweight and clean, and can readily be printed with publicity and information on contents, amounts and weights. They are available in a wide range of sizes, designs and strengths.

Disadvantages are:

- they may, if used only once, prove an expensive recurring cost (if multiple use is intended, the boxes may be easily collapsed when empty);
- they are easily damaged by careless handling and stacking;
- they are seriously weakened if exposed to moisture;
- they can be ordered economically only in large quantities; small quantities can be prohibitively expensive.

Moulded plastics: Reusable boxes moulded from high-density polythene are widely used for transporting produce in many countries. They can be made to almost any specifications. They are strong, rigid, smooth, easily cleaned and can be made to stack when full of produce and nest when empty in order to conserve space.

Disadvantages are:

- they can be produced economically only in large numbers but are still costly;
- they have to be imported into most developing countries, adding to the cost and usually requiring foreign currency for their acquisition;
- they often have many alternative uses (as washtubs, etc.) and are subject to high pilferage rates;
- they require a tight organization and control for use in a regular go-and-return service;
- they deteriorate rapidly when exposed to sunlight (especially in the tropics) unless treated with an ultraviolet inhibitor, a factor adding to the cost.

Despite their cost, however, their capacity for reuse can make them an economical investment. The Thailand study mentioned above showed plastic containers are still usable after more than 100 journeys.

Natural and synthetic fibres: Sacks or bags for fresh produce can be made from natural fibres like jute or sisal or from synthetic polypropylene or polyethylene fibres or tapes. "Bags" usually refers to small containers of up to about 5 kg capacity. They may be woven to a close texture or made in net form. Nets usually have a capacity of about 15 kg. Bags or sacks are mostly used for less easily damaged produce such as potatoes and onions, but even these crops should have careful handling to prevent injury.

Disadvantages are:

- they lack rigidity, and handling can damage contents;
- they are often too large for careful handling; sacks dropped or thrown will result in severe damage to the contents;

- they impair ventilation when stacked if they are finely woven;
- they may be so smooth in texture that stacks are unstable and collapse; they are difficult to stack on pallets.

Paper or plastic film:

Paper or plastic film is often used to line packing boxes in order to reduce water loss of the contents or to prevent friction damage. Paper sacks can have walls of up to six layers of kraft (heavy wrapping) paper. They can have a capacity of about 25 kg and are mostly used for produce of relatively low value. Closure can be done by machine stitching across the top (recommended only for large-scale crop production) or in the field by twisting wire ties around the top by means of a simple tool.

Disadvantages are:

- walls of paper are permeable by water or vapour and gases (walls may be waterproofed by incorporating plastic film or foil, but sacks retain gases and vapour);
- heat can be slow to disperse from stacks of sacked produce, thus damaging fruit or leafy vegetables;
- limited protection to contents if sacks are mishandled.

Plastic-film bags or wraps are, because of their low cost, widely used in fruit and vegetable marketing, especially in consumer-size packs. In many developing countries, however, large polythene bags are and should not be used to carry produce, especially to market.

Disadvantages are:

- they offer almost no protection from injury caused by careless handling;
- they retain water vapour thus reducing water loss from the contents; but where temperature changes occur, they cause a heavy buildup of condensation leading to decay;
- they cause a rapid build-up of heat if bags are exposed to sunlight;
- they permit only slow gas exchange; this combined with vapour and heat leads to very rapid deterioration;
- they should not be used for carrying produce; even with perforations for ventilation, plastic bags should not be used unless the package can be refrigerated.

Consumer packs wrapped in plastic are not recommended under tropical conditions except perhaps in stores with refrigerated display cabinets.

7. STORAGE OF HORTICULTURAL CROPS

Storage constitutes an important link of the value chain of a horticultural produce. Hence it is imperative to learn the dynamics of the storage aspects from the marketing viewpoint.

Controlled conditions:

The term "storage", as now applied to fresh produce, is almost automatically assumed to mean the holding of fresh fruits and vegetables under controlled conditions. Although this includes large-scale storage of some major crops, such as potatoes, to meet a regular continuous demand and provide a degree of price stabilization. It also meets the demands of populations of developed countries and of the richer inhabitants of developing countries, providing year-round availability of various local and exotic fruits and vegetables.

In many developing countries, however, where seasonally produced plant foods are held back from sale and released gradually, storage in a controlled environment is not possible because of the cost and the lack of infrastructural development and of maintenance and managerial skills. Even in developed countries, however, there are still many people who, for their own consumption, preserve and store fresh produce by traditional methods.

Storage potential:

Much fresh produce (i.e. that which is most perishable) cannot be stored without refrigeration, but the possibilities for extending the storage life of even the most durable fresh produce under ambient conditions are limited.

Organs of survival: The organs of survival which form the edible parts of many crops such as Irish potatoes, yams, beets, carrots and onions have a definite period of dormancy after harvest and before they resume growth, at which time their food value declines. This period of dormancy can usually be extended to give the longest possible storage if appropriate conditions are provided. This factor is called the storage potential.

It is important to recognize the variation in the storage potential of different cultivars of the same crop. Experienced local growers and seed suppliers can usually provide information on this subject.

Edible reproductive parts: These are largely confined to the fruits or seeds of leguminous plants (peas and beans). In their fresh condition, these products have a brief storage life, which can be only slightly extended by refrigeration. They can also be dried, and then are called pulses. Pulses have a long storage

life, provided they are kept dry, and do not present a storage problem of the sort affecting fresh produce.

Fresh fruit and vegetables: These include the leafy green vegetables, fleshy fruits and modified flower parts (e.g. cauliflower, pineapple). The storage potential of these is very limited under ambient conditions. They quickly deteriorate because of their fast respiration rates, which cause rapid heat buildup and the depletion of their high moisture content.

Traditional methods of preservation are sun-drying or simple domestic processing into conserves (with sugar) and pickles (with brine or vinegar). Most fresh fruit and vegetables have a storage life of only a few days under even the best environmental conditions.

Factors affecting storage life:

The natural limits to the post-harvest life of all types of fresh produce are severely affected by other biological and environmental conditions:

Temperature. An increase in temperature causes an increase in the rate of natural breakdown of all produce as food reserves and water content become depleted. The cooling of produce will extend its life by slowing the rate of breakdown. (Refer appendix 1)

Water loss. High temperature and injuries to produce can greatly increase the loss of water from stored produce beyond that unavoidably lost from natural causes. Maximum storage life can be achieved by storing only undamaged produce at the lowest temperature tolerable by the crop.

Mechanical damage. Damage caused during harvesting and subsequent handling increases the rate of deterioration of produce and renders it liable to attacks by decay organisms. Mechanical damage to root crops will cause heavy losses owing to bacterial decay and must be remedied by curing the roots or tubers before storage.

Decay in storage. Decay of fresh produce during storage is mostly caused by the infection of mechanical injuries. Furthermore, many fruits and vegetables are attacked by decay organisms, which penetrate through natural openings or even through the intact skin. These infections may be established during the growth of the plant in the field but lie dormant until after harvest, often becoming visible only during storage or ripening.

Storage structures:

Ventilated stores. Naturally ventilated structures can be used for the storage of produce with a long storage potential, such as roots and tubers, pumpkins,

onions and hard white cabbage. Such stores must be designed and built specifically for each intended location. Any type of building can be used provided that it allows the free circulation of air through the structure and its contents.

The following essentials must be observed:

- the building should be located at a site where low night temperatures occur over the required storage period;
- it must be oriented to take maximum use of the prevailing wind for ventilation;
- the material covering the roof and walls should provide insulation from the heat of the sun; grass thatch on a bush-pole frame can be very effective, particularly if it is wetted to provide evaporative cooling;
- double-skinned walls will provide better insulation, if cost allows;
- white paint applied to surfaces of man-made materials will help to reflect the heat of the sun;
- the structure should be built in the shade of trees if they do not interfere with the prevailing air flow; beware of bush fires and of trees falling during storms;
- provide ventilation spaces below the floor and between walls and roof to give good air flow;
- if the store is subject to cold night temperatures, fit movable louvers and adjust them to limit the flow of warm air into the store during the day.

These are the basic requirements of a ventilated store. Such stores may be constructed to various levels of sophistication, using, where it is economically acceptable, fan-assisted ventilation controlled by differential thermostats. This type of store is in common use in Europe for the bulk storage of Irish potatoes and onions in locations where external winter conditions make possible the accurate control of the storage temperature.

Simple open-sided, naturally ventilated structures may be used to store seed potatoes at high altitudes in warm climates. They cannot be used for table potatoes, which will turn green, develop a bitter taste, or even become toxic if exposed to light for more than a few hours.

Clamps. These are simple, inexpensive structures used to store root crops, particularly potatoes in Europe and Latin America.

The potatoes are placed on a bed of straw 1 to 3 m wide, but not more than 1.5 m wide in warm climates. A ventilating duct should be placed along the bottom. The piled potatoes are covered with about 20 cm of compacted straw, which can subsequently be encased in soil, applied without compaction up to 30 cm deep.

The clamp system can be modified for different climatic conditions. In warm climates, extra straw casing may be used instead of soil in order to give added ventilation. (Reproduced from Principles of potato storage, International Potato Centre, Lima, 1981)

Other simple storage methods: Windbreaks are narrow, wire-mesh, basket-like structures about 1 m wide and 2 m high, of any convenient length, on a raised wooden base, and are used for short-term storage of dried onions in the field. The onions are covered on top with a 30 cm layer of straw, which is in turn held down by a polythene sheet fastened to the wire mesh. The windbreak is built at right angles to the prevailing wind to obtain maximum drying and ventilation. Onions can also be woven into plaits on twine and hung in a cool dry place, where they will keep for several months.

Refrigerated and controlled-atmosphere storage: For large-scale commercial operations, refrigerated storage may be used in a cold-chain operation to carry regular consignments from production areas to urban markets and retailers. This can be a highly complex operation requiring expert organization and management. Cold storage can also be used for long-term storage of seasonal crops such as potatoes and onions. The storage life of some fruits, such as apples, can be extended by combining refrigeration with a controlled environment consisting of a mixture of oxygen and carbon dioxide. These are expensive operations with high maintenance and running costs, and demand skilled and experienced management. They have relatively little application to small-scale production in developing countries.

Controlled atmosphere (C.A.) storage: Controlled or modified atmosphere storage should be used as a supplement to and not as a substitute for, proper temperature and relative humidity management. Some simple methods for modifying the composition of air in the storage environment are listed below (from Kader, 1992). Air coming into the storeroom or being re-circulated within the room must pass through a monitoring and control system.

Oxygen gas control: to Decrease

- purging with nitrogen
- from liquid nitrogen through an evaporator
- from a membrane system nitrogen generator
- from a molecular sieve system nitrogen generator

Carbon dioxide control: to Increase

- dry ice
- pressurized gas cylinder

to Decrease:

- Molecular sieve scrubber
- activated charcoal scrubber
- sodium hydroxide scrubber
- hydrated lime (use 0.6 kg of hydrated lime to treat the air used to ventilate 100 kg of fruit Air can be directed to pass through a box, located inside or outside the C.A. storeroom).

Ethylene control: to Decrease:

- potassium permanganate
- activated charcoal

8. TRANSPORTATION

Transportation is a big and often the most important factor in the marketing of fresh produce. Ideally, transport would take produce from the grower directly to the consumer, as in many developing countries. In more complex marketing systems (those serving towns, cities or distant countries) the cost of transport contributes significantly to the price paid by the consumer, and sometimes exceeds the value of the raw product.

Losses directly attributed to transport conditions can be high. The goal of every person concerned with transport should be that the produce be kept in the best possible condition during transport and that the haulage of produce be quick and efficient. To this end, produce should be properly packaged and properly loaded on a suitable vehicle.

Causes of loss

The damage and loss incurred during non-refrigerated transport are caused primarily by mechanical damage and by overheating.

Mechanical damage. Damage of this type occurs for many reasons, including:

- Careless handling of packed produce during loading and unloading;
- Vibration (shaking) of the vehicle, especially on bad roads;
- Fast driving and poor condition of the vehicle;
- Poor stowage, which allows packages in transit to sway; the stow may collapse
- Packages stacked too high; the movement of produce within a package increases in relation to its height in the stack.

Overheating. This can occur not only from external sources but also from heat generated by the produce within the package itself.

Overheating promotes natural breakdown and decay, and increases the rate of water loss from produce.

The causes of overheating include:

- Use of closed vehicles without ventilation;
- Close-stow stacking patterns blocking the movement of air between and through packages, thus hindering the dispersal of heat;
- Lack of adequate ventilation of the packages themselves;
- Exposure of the packages to the sun while awaiting transport or while trucks are queuing to unload at their destination.

Reduction of losses during transport

The risk of deterioration of produce during transport can be reduced in several ways.

Trucks used to transport fresh produce: Most fresh produce is now moved in road vehicles, with lesser amounts by sea, air or inland waterways. The vehicles in most common use are open pick-ups or bigger trucks, either open or enclosed. The use of road vehicles is likely to increase, so users should give attention to the following:

- Closed vehicles without refrigeration should not be used to carry fresh produce except on very short journeys, such as local deliveries from farmers or wholesalers to nearby retailers;
- Open-sided or half-boarded trucks can be fitted with a roof on a frame. The open sides can be fitted with canvas curtains which can be rolled up or moved aside in sections to allow loading or unloading at any point around the vehicle. Such curtains can protect the produce from the elements but still allow for ventilation. Where pilfering is a problem, the sides and rear of the truck must be enclosed in wire mesh;
- A second, white-painted roof can be fixed as a radiation shield 8 or 10 cm above the main roof; this will reflect the sun's heat and help to keep produce cool;
- For the ventilation of long-distance vehicles, more elaborate air intakes can be fitted in conjunction with louvres, to ensure a positive air flow through the load;
- Refrigerated trucks or road, rail or sea containers may be used for long journeys, but the cost of such transport makes it uneconomical for small-scale operations.

Handling and storage practices: Although the shape and condition of trucks are important factors in fresh produce transportation, the loading and stowing methods in vehicles are pertinent to damage and loss:

- The best loading factor must be achieved, that is the maximum load that can be carried economically under satisfactory technical conditions: a stable and well-ventilated load;
- The size and design of packages should give adequate levels of ventilation of contents with the minimum of wasted space, and the packages should be strong enough to protect the contents;
- Loading and unloading of vehicles should be properly supervised to prevent careless handling of packages; loading aids such as trolleys, roller conveyors, pallet or forklift trucks should be used where possible to reduce the handling of individual packages;

- Stowage should be carefully done to avoid collapse of the stow during transport; packages should not be stacked higher than the maximum recommended by the maker, otherwise the bottom layers may collapse under the weight of those above
- Packed produce should be protected from sun and rain at all times including during loading and unloading.
- Packages should be loaded on dunnage (pieces of lumber or slatted racks) on the beds of vehicles, or on pallets in order to allow the circulation of air around stacks during transport;
- If the load is to be distributed to several locations, packages should be loaded in reverse order to that in which they will be unloaded, i.e. last on, first off; at the same time the load should be distributed evenly on the vehicle.

Although every care may be taken to observe all the above precautions, the standards of driving remain a difficult problem to overcome. In many cases, drivers are induced to speed in order to make more money for themselves or their employers. Whenever possible, only experienced and responsible drivers should be employed.

Other modes of transport: Fresh produce is transported by many other means, from head-loads to air-freighting. In all cases, the same conditions should be observed. Produce must be:

- Kept as cool as possible;
- Kept dry;
- Moved to market as quickly as possible.

Rail transport. In some countries a large amount of produce is carried by rail.

The advantages are:

- Transport damage to produce while moving is slight as compared with that from haulage over rough roads;
- Costs are lower than transport by road.

Rail transport, however, requires extra handling since road transport is needed to and from the rail journey; transport by road alone usually is a door-to-door service.

Water transport

Inland. Waterway transport is used in some countries to move produce to markets. Much of the produce carried in this way is packed in locally made crates or sacks. The vessels employed are often mixed passenger-cargo craft, and no special handling is provided for fresh produce.

Sea. Short-distance transport of fresh produce in small ships without refrigeration is common in countries of island communities (e.g. the Philippines). Ships often accommodate passengers and general cargo, and no special provision is made for fresh produce, which may be stowed in unventilated holds. Losses are high, owing to rough handling by porters, inadequate packaging and overheating in unventilated holds or near engine rooms.

There is much room for improvement in this mode of transport. A model for organized and efficient sea transport is the refrigerated shipment of commercial crops such as bananas, although a modest investment by the small-scale shipper could greatly improve performance.

Air freight: As with shipping, the international trade in the air-freighting of high-value exotic crops is generally well organized. In some countries where road links are poor (e.g. Papua New Guinea), produce is carried by air from production areas to urban markets. Costs are high and losses often heavy because of:

- Poor, non-standard packages;
- Careless handling and exposure to the elements at airports;
- Consignments left behind in favour of passengers;
- Flight delays owing to bad weather or breakdowns;
- Intermittent refrigeration followed by exposure to high temperatures;
- Relatively small produce shipments.

Even though changes are made in packaging and handling, it is unlikely that the overall situation will improve much until road links are established between producers and consumers.

9. IT – BASED MARKET INFORMATION SYSTEM

Agricultural produce marketing requires connectivity between the market and exporter/growers/traders, industry consumers, through wide area network (WAN) of National and International linkages in order to provide day-to-day information with regard to commodity arrivals and prevailing rates etc., to provide links for online International Market Information; to provide export-related documentation, to inform about the latest research in agricultural marketing, packaging/storage etc. related information and to provide linkage/connectivity with the World Trade Centers (WTCs), APEDA, NIAM, NBB, DNH, IIP, State Agricultural Marketing Boards, universities etc.

A national level IT-based integrated Agricultural Marketing Information service (AMIS) with a Decision support System (DSS) plays an useful role in helping the different stakeholders for taking decisions related to storing, pricing, marketing etc. One of the major problems in designing AMIS is that the information needs of the individual target groups are diversified. For evolving an information system, assessment of information needs of the diverse target group is very important so that the information management is holistic and integrated. The following tables indicate the diversity of information required by different stakeholders of agricultural marketing:

FARMERS

Decision	Information Required
What crop to plant? What Variety?	Historical prices of different crops Prices of different varieties Production cost of different crops and varieties
When to plant? When to sell?	Seasonal variations in prices
Should I harvest? Where to sell?	Current prices in different markets Marketing costs for alternative markets

TRADERS

Decision	Information Required
What crop to sell? What Variety?	Historical prices of different crops Prices of different varieties
What to pay the farmer?	Current prices
Where to sell?	Current prices in different markets Quantity demanded in different markets Quantity supplied to different markets Marketing costs

CONSUMERS

Decision	Information Required
What to buy?	Current prices of different crops
Where to buy?	Current prices in different markets Cost involved in purchasing at alternative markets

POLICY MAKERS

Decision	Information Required
Are improvements in marketing information needed?	Historical prices at different levels of sale (wholesale and retail) Seasonal price variations Quantities supplied
What specific measures needed?	Market Margins Price trends in different markets

E-Catalogue for Commodity Profiles: In the present time of export competitiveness, each and every product needs to be publicized highlighting its characteristics on nutrition values, chemistry, quality standards, seasonality, quantity for supply and prices etc. A brief commercial profile of the commodity would help the buyer in making comparative analysis on account of cost and margins. Therefore, it is necessary that each commodity has specific commercial profile giving the details as mentioned above. Profiles should be transmitted to international markets through "Web Pages". Main objective of the scheme will be (a) to prepare commercial profiles of exportable commodities and (b) to give exposure of commodities to the international markets.

National Atlas of Markets: The mapping of the agricultural markets of the country is a prerequisite for carrying any planning/developmental activity. All the regulated markets along with their classification on the national maps will give synoptic view of the distribution of the markets. The infrastructure facilities, the quantum transacted, the area and population served, the outflow and the inflow of the commodities are the various aspects, which should be mapped out. This would be useful for research and policy making. The National Atlas of Agricultural Markets should be based on the application of GIS tools; such mapping activity then can also be put on the Internet for its greater usage.

AGMARKNET: As a step towards globalisation of agriculture, the Directorate of Marketing & Inspection (DMI) has embarked upon an ICT project: "NICNET based Agricultural Marketing Information System Network (AGMARKNET)" in the country, during the Ninth Plan, for linking all important APMCS (Agricultural Produce Market Committees), State Agricultural marketing Boards/Directorates

and DMI regional offices located throughout the country, for effective information exchange on market prices. NIC implements this project on a turn-key basis.

This AGMARKNET project has already networked more than 1000 Agricultural Produce Wholesale Markets (APWMs), 75 State Agricultural Marketing Boards/Directorates and DMI Regional Offices so far and planned to cover about 2000 Markets during the Tenth Plan Period (2002-2007). AGMARKNET appears to be filling a huge gap by providing access to information at reasonable cost. The AGMARKNET venture is a heartening initiative from the much criticized and slow-to-react government, especially on the issue of easing the infrastructure constraints on agriculture.

Advantages:

The advantages of AGMARKNET database accrue to the farmers, as they have choices to sell their produce in the nearest market at remunerative prices. In addition to this, the Country witnesses:

- Nationwide market information for wholesale produce
- Project supported by various Departments and State Boards of Agricultural Marketing
- Access mainly through the Internet
- Information dissemination progressively through local Languages
- Computer facilities at the markets
- Software for downloads - Daily market prices
- Information collected by nodes in the various markets
- Weekly trends
- Information on loans, policies and regulations
- Bypass middlemen
- Data Dissemination through NGOs, SHGs, KVKs, GISTNIC,
- Cooperatives etc.

This Digital Advantage Project is progressively achieving the following:-

- Reaching the Unreached i.e. resource poor farmers
- Reduction of distress sale
- Right to information
- Base for production planning
- Base for marketing-led agricultural extension
- Increased competition
- Reduced marketing margins
- Vertical linkages in export crop
- Markets that connect multiple nations
- Traders to domestic traders

AGMARKNET is an effort to bring rural people into the mainstream economy.

Potential Expansion

This AGMARKNET venture benefits the farming communities from the new global market access opportunities and also strengthens the internal agricultural marketing system in India. This project has the potential of expansion to about 7000 Wholesale Markets located through out the country and further to 30,000 Rural Markets in India. This ICT Project is a 'farmer centric" project to put the progressive farmers on "global free trade zone on Internet" and a broad Framework to usher in Rural Prosperity. AGMARKNET Programme plays a catalytic role for ushering in "market-led agricultural extension" in India, highly scalable, planned through bottom-up process, and implemented through active involvement and collaboration of Agricultural Produce Market Committees (APMCs) in India. This "digital development in rural areas" of India facilitates rural prosperity, rural empowerment, and a warehousing of "data for development"- a step towards digital inclusion to foster rural enterprises in India.

Market Information Contents of Agmarknet

Market related information such as market fee, market charges, costs, method of sale, payment, weighment, handling, market functionaries, development programmes, market laws, dispute settlement mechanisms, composition of market committees, income and expenditure etc.

- Price-related information such as minimum, maximum and modal prices of varieties and qualities transacted, total arrivals and dispatches with destination, marketing costs and margins etc; price trend analysis, international prices etc.
- Infrastructure related information comprising facilities and services available to the farmers with regards to institutional credit, storage, direct markets, grading, re-handling and re-packing etc.; and
- Promotion related information such as accepted standards and grades, labeling, sanitary and phyto-sanitary requirements, pledge finance, marketing credit and new opportunities available in respect of better marketing
- Important producing areas and volumes of commodity grown;
- Important varieties in demand in national and international markets
- Wholesale and retail outlets and important trading and consuming centers;
- Facilities for direct marketing to consumers and processing units;
- Marketing related schemes of the government and public sector organizations
- Prospects and opportunities for agricultural marketing, both at domestic and international level

Collecting Market Information

- Static information about markets, infrastructure etc. are compiled by conducting surveys from time to time.
- Dynamic information (e.g. prices and arrivals) are collected from each market on all functional days
- Supply Chain Analysis; Good marketing practices, Emerging opportunities, both at domestic and international levels, emanate from research studies
- Schemes related information from respective Departments

Covering the last mile for disseminating Market Information

Since all the farmers in India do not have access to ICT-based information, there is a need for the following for disseminating the information generated through the IT-based network.

- A mixed approach needs to be adopted.
- All channels to be used e.g. Radio, TV, Newspapers, Phones, Internet, Word of mouth
- Farming community need to be educated about changing competitive scenario and Govt. initiatives through massive publicity campaigns
- Extension workforce needs to be sensitised about their role and it needs to be re-defined. Agricultural marketing aspects need to be given more emphasis.

Besides Agmarknet, following are some of the other information networks relevant for agricultural marketing:-

- **AGRISNET:** An infrastructure network up to block level agricultural offices facilitating agricultural extension services and agribusiness activities to usher in rural prosperity.
- **ARISNET:** Agricultural Research Information System Network
- **SeedNET:** Seed Informatics Network
- **CoopNet:** To network 93000 Agricultural Primary Credit Societies (PACS) and Agricultural Cooperative Marketing Societies to usher in ICT enabled services and rural transformation
- **HORTNET:** Horticultural Informatics Network
- **FERTNET:** Fertilisers (Chemical, Bio and Organic Manure)

- Informatics Network facilitating “Integrating Nutrient Management” at farm level
- **VISTARNET:** Agricultural Extension Information System Network
- **PPIN:** Plant Protection Informatics Network
- **APHNET:** Animal production and Health Informatics Network networking about 42000 Animal Primary Health Centres
- **FISHNET:** Fisheries Informatics Network
- **LISNET:** Land Information System network linking all institutions involved in land and water management for agricultural productivity and production systems, which has now evolved as “Agricultural Resources Information System” project during the Tenth Plan being implemented through NIC.
- **AFPINET:** Agricultural and Food Processing Industries Informatics Network

A number of other public agencies/NGOs/non-profit-agencies and private agencies are also disseminating information. A diagrammatic presentation of these agencies is placed below:

Agriculture Market Information in India

