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Summaries

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Labour Demand and Supply Responsiveness of Banana in Chidambaranar District: An Econometric Analysis

G. Subramaniyan and L. Kumaragurubaran*

Among the states in India, Kerala, Maharashtra and Tamil Nadu are ranked in that order in the production of banana. Banana is basically a labour intensive crop. Among various inputs used, human labour alone accounted for 40 per cent of the total cost of banana cultivation.The paper attempts to estimate the elasticity of output with respect to various inputs and to identify the factors affecting labour employment at the farm level. To pursue the above objectives, a random sample of 250 farmers growing banana crop was chosen from top ten villages in Srivaikundam taluk of Chidambaranar district of Tamil Nadu. The farmers were further stratified with regard to farm size (small and large) and banana variety grown (*Poovan* and *Nadu*). The data on inputs used and output pertain to the agricultural year 1992-93 and field enquiries were made during 1993-94. A simultaneous equation model of the log linear form was used to study labour demand and output supply. Since the model is exactly identified, indirect least squares method of estimation was used to obtain structural coefficients from the reduced form coefficients. Elasticities for output supply and labour demand were worked out at mean levels.

For the farmers producing banana, the explanatory variables output, farm size, bullock labour, fertiliser, organic manure and number of irrigations had a positive impact on the demand for labour. Among all the inputs used, banana is highly responsive to fertiliser and human labour. Inverse relationship between farm size and output prevailed. This speaks in favour of small farming. Further, the demand for human labour is price inelastic. The use of bullock labour and human labour is complementary to each other.

Some Aspects of Fruit Production and Consumption in India

Kailash C. Sharma†

The paper deals with some aspects of fruit production and consumption in various regions of the world and in India to draw some implications for increasing fruit production in the country. India ranked first in the world in fruit production in 1993 producing about 32 million tonnes of fruits, accounting for about 9 per cent of world fruit production. However, in terms of per capita fruit production, the world average is 66.9 kg per annum whereas for India the figure is 37.8 kg for triennium ending 1993, forming about 57 per cent of the world per capita production. Encouragingly, the growth in fruit production during 1980-90 has been relatively faster in India than in other regions in the world.

Within India, Uttar Pradesh (19.7 per cent of India's total fruit production) is the largest fruit producing state, followed by Andhra Pradesh (12.5 per cent) and Maharashtra (11 per cent). However, the per capita production is the highest in Karnataka (71 kg per annum)

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and the lowest in West Bengal (16.6 kg). In terms of productivity (yield per hectare), Tamil Nadu (16.5 tonnes/ha) ranks first whereas Himachal Pradesh (2.1 tonnes/ha) ranks last among the major fruit growing states in India. The major fruits grown in India are mango, banana, citrus, apple, guava, pineapple and grapes.

As regards consumption, the per capita consumption of fruits is estimated to be about 16.6 kg per annum based on National Sample Survey data for 1987-88 and assuming 25.7 per cent of urban population in India. Thus fruit consumption in India is about 44 per cent of per capita fruit production. It is clear that the transition from production to consumption is governed by various factors such as prices, incomes, trade, infrastructural facilities such as transport and storage, tastes and preferences. If the level of fruit consumption is to increase significantly in India from about 45 gram per capita per day to the recommended level of 140 gm per capita per day, it is important to emphasise the role of adequate marketing infrastructure including storage and transport along with productivity increasing methods of fruit production.

Integration of Production, Procurement, Processing and Marketing through Co-operatives: A Study of HOPCOMS (Karnataka)

V.M. Rao*

The study traces the development and functioning of Horticultural Producers' Co-operative Marketing and Processing Society Ltd. (HOPCOMS) since its inception and elicits the opinions of producers, consumers and the personnel responsible for the success or failure of the society. The data for the study were obtained from primary and secondary sources. The secondary data on progress of the society during 1970-71 to 1995-96 were collected from various published and unpublished records of the society. The Bangalore Grape Growers Co-operative Marketing and Processing Society Limited was established in 1959 with a view to encourage grapevine cultivation by providing required inputs, etc., in and around Bangalore. Later it was renamed as the Bangalore Horticultural Producers Co-operative Marketing and Processing Society Ltd. in 1983 and once again renamed as HOPCOMS in 1987. The society incurred losses during 1959-75 and since then, it improved its financial viability. At present there are 9,609 individual members and 39,996 sales counters spread over eight districts of Karnataka. It has 12 input distribution centres and the value of inputs supplied increased from Rs. 1.55 lakhs in 1990-91 to Rs. 2.40 crores in 1995-96. A large part of the share capital is contributed by government and hence the stakes of members and their participation in decision-making is very limited. Efforts should be made to increase membership and educate the members about their duties and responsibilities. There is a need for restoring democratic management in its true spirit which will help

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in achieving its objectives. The society meets only 6-7 per cent of the total requirement of fruits and vegetables of the command area. Operations at procurement centres, open purchase of fruits and vegetables, and route supervision should be made transparent and effective. Available inventory (cold storage/vehicles/refrigerated vans, waxing unit, etc.) should be put to optimum use.

Both producers and consumers are happy with the working of the society. The producers opined the need for credit facilities, and training in horticultural practices. The society should advise members on cropping pattern of fruits and vegetables and supervise fields on regular basis so that required quality raw material can be obtained. Further, it may accept all the quantities brought by the producers and make payment on the basis of grades. The excess produce can be sent to deficit areas or it may be further processed so that value addition can take place. The society may think of providing guarantee on behalf of the producers to the banks so that farmers can get the required loan which can be deducted from the sale proceeds and passed on to the bank. The consumers opined that HOPCOMS should follow aggressive marketing strategy. Besides increasing retail sales counters, attempts should be made to increase bulk supplies to institutional customers. Information network should be strengthened by connecting sales counters/procurement centres with head office through computer networking.

India's Horticultural Exports: Status, Constraints and Future Prospects

Brahm Prakash and Sushila Srivastava†

In this paper, based on the secondary data obtained from various sources, an attempt has been made to identify the horticultural products having vast potential for boosting exports; to explore the export opportunities in the global market; to review the present status of horticultural exports in the country; and their contribution to total exports; to identify the major constraints and to suggest the strategies for promoting the exports of horticultural products. The study revealed that fresh fruits, processed fruits like fruit juices, pulps, jams, concentrated paste, dry fruits, pickles and chutneys; fresh vegetables, non-traditional vegetables like asparagus, celery, pepper and sweet and baby corn etc., dried and preserved vegetables, mushroom-morshella and button mushroom, tissue culture plants of fruits and vegetables, flowers like chrysanthemum, rose, crossandra, jasmine, champak, tuberose, aster and marigold, a number of ornamental plants, dry flowers, dried plants and flower seeds

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and scents of rose and jasmine, etc., have vast scope for steady export. Exports of all horticultural products have been increasing steadily. Export earning from horticultural products which was only Rs. 6 crores during 1960-61 has increased to about Rs. 1,038 crores during 1993-94, recording an increase of about 170 times. The share of fruits, vegetables and processed products in total agricultural export which was merely 2 per cent in 1960-61 has increased upto about 10 per cent. Fresh fruits and vegetables are the most important horticultural products in terms of value of exports, followed by processed fruits and vegetables, floriculture and seeds.

Although the exports of horticultural products reach all continents, the major importers are West Asian countries, U.S.S.R., U.K., Germany, U.S.A., Canada and South Africa. Gulf countries, Japan, South Korea and Bangladesh are other potential importers. Lack of suitable varieties and improved technology of production, low production and low exportable surplus, poor quality, high cost of production, protectional tariff in developed countries, stiff competition in international markets, lack of publicity and R & D support, poor market intelligence, export in the form of raw materials rather than value added products, no brand status to commodities, inadequate infrastructure, poor storage, processing and packing system, inadequate cargo space and high air freight are the major constraints in boosting the exports of these commodities. The exports of horticultural commodities can be boosted by co-ordination of different agencies, developing improved varieties and production technology, increasing the production and exportable surplus, R & D support, increasing investment in horticultural sector, exploiting the value added products, providing brand status to the items, creating the required infrastructure and developing transport, storage, processing and packing system, providing incentives for export, providing training to the personnel involved in the export business and arranging publicity in International Trade Fairs.

New Arrangements in Hortibusiness: Implications of Contract Farming

Sukhpal Singh*

Contract farming is emerging as an important mode of procurement of raw materials by agribusiness firms in India due to the developments in the field of marketing, food habits, technology, and agriculture in the new economic environment. Contract farming essentially is an arrangement between the primary producers and the agribusiness firm in order to procure certain pre-agreed, quantity and quality of the produce at a particular price and time. It can only be a pure procurement transaction or can extend to the supply of inputs or even beyond.

This paper looks at the concept, rationale, and implications of contract farming in the context of developing countries in order to draw some lessons for the emerging scenario in

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Indian agribusiness. It discusses the implications - both positive as well as negative - especially for the producers in developing countries with the help of evidences from African, Latin American, and Asian countries in different sectors of horticulture. It is found that agribusiness firms prefer to deal with large producers only, and that small and marginal producers are left out in the process of agro-expansion and stand to lose in the new competition. Contract farming as a system impacts producers in a positive or negative manner depending on the context of the local economy. But there can be a possibility of using the contract for the benefit of all if stakes are created and contracts are made more public, accountable and relevant for development, as the agribusiness growth and economic growth and development are not necessarily contradictory. There are various ways for the firms and producers to benefit from this arrangement especially in horticulture by forging a meaningful partnership with each other. The ways to bring about this partnership between agribusiness firms and producers are outlined in the paper.

Export of Floricultural Products: Problems and Prospects

S.R. Asokan and S.N. Chokshi[†]

The paper discusses the problems and the potential for exporting Indian floricultural products and the constraints faced by the Indian exporters. It is estimated that around 35,000 hectares are under floriculture in India. Most of the area is under traditional varieties and only a small percentage is under modern varieties such as carnation, gerbera, gladioli and orchid. There is a strong domestic market for flowers and a huge export market. However, the demand for the type of flowers for overseas market is entirely different from the domestic market. The worldwide trade for floricultural products such as cut-flowers, foliage, etc., is estimated to be 40 billion US dollars and it has been registering a 15 per cent growth rate in recent years. India exported floricultural products valued at 16 million dollars during 1995-96, which is not even a fraction of one per cent of the global trade in floricultural products. India can emerge as major exporter of flowers and allied materials as it has several advantages such as skilled and cheap labour, favourable agro-climatic conditions for growing different types of flowers at different times of the year. However, various constraints, infrastructural bottlenecks, etc., hinder the blossoming of the industry. Realising the potential of the industry in earning foreign exchange, the Government of India initiated a series of positive steps in recent years to boost the sector. Exemptions from customs duty on imported plant material are given. The duties on materials for green houses are reduced. A subsidy of 25 per cent on airfreight is provided. Further, the Government approved around 150 projects with a total investment of Rs. 1,000 crores in the early nineties. As a result, there was a surge in India's exports. India exported floricultural products worth Rs. 5.67

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crores during 1990-91 which increased to Rs. 55.94 crores during 1995-96.

India's export of floricultural products is mainly to Europe and North America followed by Japan. But India's export is negligible when compared to the size of these markets. Even countries like Israel and Kenya export large volume of flowers to these markets. Some of the reasons for India's inability to capture the international market are attributed to poor quality of products, lack of infrastructure for post-harvest care, production on small farms, poorly developed domestic flower market and restrictive trade practices.

In order to increase the share of its exports in the booming floriculture trade India should chalk out well planned strategies. The public sector research efforts in developing plant material should be re-focused and should be in tune with the emerging market trends. The private sector should also invest in their own research efforts to reduce their dependence on the public sector. Investment in post-harvest handling facilities should be increased. Delays and mishandling of the consignment at the airport by overzealous officials should be avoided. Since flower production is in small area by individual farmers procurement, handling and shipment can be done collectively by such farmers through co-operative organisation in order to realise the economies of scale. The states like Maharashtra and Karnataka have decided to amend land ceiling acts in favour of floriculture activity which would enable cultivation of flowers in a large and compact area. Other states should also amend the ceiling acts to enable expansion of the area under the activity. Since the markets of Europe, North America and Japan are already well established by the major exporters, India should concentrate on the emerging markets such as Taiwan, Singapore, etc., which would help to capture the markets in these countries in the future. The dried flower market is expanding as it lasts longer and environmental-friendly as well. India, which has all the advantages of abundant materials, cheap labour, etc., should concentrate on the export of dry flowers to increase its market share.

An Economic Analysis of Comparative Performance of Potato and Other Crops in Indore District, Madhya Pradesh

S.K. Gupta, A. Shrivastava, A.M. Mishra* and M.C. Athavale**

An attempt has been made in the paper to examine the economics of cultivation of potato and other non-horticultural crops of wheat and soybean and their comparative profitability, the labour requirement of all crops and the constraints of development of potato in Madhya Pradesh. Indore district having the largest area under potato (among horticultural crops) was selected for the study. A sample of 30 farmers - 15 growing potato and 15 growing crops other than potato - were selected. The district produced a wide variety of crops like jowar, maize, wheat, gram, potato, soybean and fodder. Potato was grown on 19.27 per cent of the area, the largest in the state. For input-output analysis, operationwise data were collected. The average cost per hectare of potato was Rs. 25,455 which was consistent in all the size-groups. The output per hectare was Rs. 57,621 and the average net return per hectare

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was Rs. 32,166. In potato cultivation sowing operation is labour intensive. Therefore, the item seed and sowing constituted 43 per cent of the total cost. Fertiliser cost, marketing charges and cold storage charges accounted for 9, 9.35 and 8 per cent respectively of the total cost. The proportion of cold storage charges increased with the increase in the size of holdings. In the case of soybean, the total cost per hectare on the participant farms was Rs. 6,412 and that on non-participant farms was Rs. 4,791. The higher cost on participant farms was due to manures, interculture operations and marketing charges. The value of output on participant farms was higher (Rs. 15,384) than on non-participant farms (Rs. 11,976). The net return per hectare on participant farms was higher (Rs. 8,972) than on non-participant farms (Rs. 7,185). In the case of wheat, the cost and value of output and the net return per hectare were higher on non-participant farms. It was observed that there was not much difference in the cost, output and net return per hectare between the participant and non-participant farms.

Comparative figures on cost, output and profit per hectare of potato, soybean and wheat showed that the profit per hectare of potato was much higher than that of soybean and wheat. Labour days requirement per hectare was the highest (223 days) for potato, followed by soybean (91 days) and wheat (76 days). In the case of potato and soybean, maximum number of days was required for interculture operations. In wheat, maximum number of days was required for harvesting, threshing and winnowing.

Several constraints were identified in the development of potato. The cultivation of potato being capital and labour intensive, only the large and rich farmers were attracted towards this crop. No regulated markets existed. The difference between wholesale and retail prices was up to 50 per cent. There was insufficient availability of water at all stages of the growing season. Electricity supply was a big problem for irrigation as well for cold storage.

Producer's Share in the Consumer Rupee in Potato

S.K. Singh, B.B. Singh and R.P. Singh[†]

An attempt has been made in the study to examine the marketing cost, margins of functionaries and producer's share in the consumer price in potato with reference to Krishi Utpadan Mandi Samittee, Paharia, Varanasi, which is one of the biggest agricultural markets involved in the marketing of fruits and vegetables in eastern Uttar Pradesh. The study is based on primary data collected from a random sample of 20 producer farmers, 15 market functionaries and 5 consumers. The market functionaries and producer sellers were interviewed with the help of pre-tested schedule about loading and unloading charges, transport, marketing cost, margin, mandi fee and licence fee, etc. The channels of potato marketing

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studied were (i) producer-wholesaler-retailer-consumer and (ii) producer-consumer.

The results of the study showed that in channel I, the producer's share in the consumer price was found to be about 59 per cent. At different levels of the functionaries, the total marketing cost involved was Rs. 49 which accounted for 41.2 per cent of the price paid by the consumer, the costs incurred by the producer farmer, the wholesaler and the retailer being 11.32, 13.09 and 16.79 per cent respectively of the consumer price. The mandi fee and commission were charged at the rate of 2 per cent and 3 per cent of the produce value. The weighing and palledari were charged at the rate of Rs. 0.50 and Rs. 1.00 per bag respectively. In the second channel no marketing cost was incurred since the producer sold his produce directly to the consumer without involving any intermediaries. No competitive environment existed in the market and malpractices were observed during investigation. Therefore, there is the need to create competition in buying and selling, keeping the interest of the small farmers. The market officials should ensure full compliance of the principles of regulated market and hence by reducing the number of intermediaries the marketing cost can be reduced and the malpractices removed.

Floriculture: An Economically Viable Enterprise

V.M. Koranne and N.B. Naik*

In this study an attempt is made to work out the cost and returns in the cultivation of rose and tuberose on a commercial basis and its economic viability. The data for the study were collected from a sample of 15 cultivators of rose and 15 cultivators of tuberose from Akola and Buldhana districts of Maharashtra State. Usual cost concepts and regression analysis are used for interpreting the results. The study revealed that both rose and tuberose are capital and labour intensive crops. The per hectare human labour utilisation was 1,246 days in rose and 1,058 days in tuberose. Net returns per thousand flowers amounted to Rs. 1,370 and Rs. 426 in the case of rose and tuberose respectively. Output-input ratios on cost 'C' basis worked out to 1.59 and 1.74 in rose and tuberose respectively, indicating relatively more profitability of tuberose. It is also revealed that marketing through 'producer-retailer-consumer' channel increased the producer's share in the consumer rupee. The spread of technical knowledge, supply of good quality planting material, provision of pre-cooling and refrigeration facilities, co-operative organisations and credit support are necessary for promoting this economically viable and income and employment generating enterprise.

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Production and Marketing of Horticultural Products in Maharashtra

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An attempt is made in the paper to study the trend, dispersion and magnitude of the horticultural production in Maharashtra State, to identify the market constraints involved in the adoption of pre-harvest and post-harvest technologies and the potentials in the marketing of horticultural products. In Maharashtra around 1.05 per cent of cultivable area is under fruit gardening and 0.68 per cent area is under vegetable crops. The trend in the cultivation of horticultural crops has become prominent since the post-drought period in the 1970s. Mango, grapes, oranges, pomegranate, ber, papaya and banana are the important fruit crops grown in the state. Onion, potato, brinjal, tomato, turmeric, cashewnut, ginger, mushrooms, chillies, coconut are the vegetables grown on a commercial basis. The Kolhe Committee (1991) was appointed to suggest ways and means of improving the performance of production and marketing of horticultural products in the state. Pre-harvest technology should focus on improving the quality of the products accompanied by the improvement in the yield rate. Advanced knowledge in this area should be reoriented with institutional linkages so as to impart the same to the farmers. Similarly low cost and energy saving post-harvest technology should be enhanced. Lot of research is taking place in this respect. However, the technology should be affordable to the cultivators. The competitiveness in the world market can only be strengthened through this technology. It is estimated that nearly 20 to 40 per cent of the horticultural products is lost during post-harvest operations. Whereas only 1.3 per cent of total production of fruits and vegetables (104 million tonnes) is processed. There is a need to develop this operation on scientific lines with a professional outlook based on economic approach.

The growing interest in horticultural exports is being reflected in the diversified non-traditional exports in order to earn more foreign exchange. The horticultural export has gone up by 10 to 13 per cent as compared to the 1975-85 decade (6.44 per cent). The share of less developed countries in total horticultural exports is growing. Developed countries accounted for nearly 83 per cent of the export market. Among fruits, mango has a share of 64 per cent in the export of India. Banana is the second largest commodity exported with roughly 10.6 per cent share in world's production. The Agricultural and Processed Food Products Export Development Authority has formulated a number of strategies to realise the export potentials. The export value of fruits and vegetables has increased since the 1980s. Fruits and vegetables (canned fruits and vegetables, dry fruits, juice, etc.) valued at Rs. 120 crores were exported in 1991-92, whereas around Rs. 317 crores worth agricultural products (onion, fresh vegetables, mango, grape) were exported in the same year.

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Most of the products are being demanded in the Far East and Middle East countries. Developed countries including U.S.A., U.K., Canada are more interested in Indian mango products, citrus fruits, mushrooms, etc. The constraints involved in the pre-harvest and post-harvest technologies should be removed. Export in Maharashtra has been confined to individual entrepreneurs. There is scope for promoting group marketing and co-operative marketing which would impart credibility among the customers of the world market. The entire operations should cater to the needs of the importers. The EXIM policy, budgetary policy and technology make their impact on the production and marketing of the horticultural products.

Changing Structure of Horticultural Production in Maharashtra: Trends and Indicators

Deepak Shah*

The paper seeks to analyse the structural changes that have taken place over time in the production pattern of various horticultural crops in Maharashtra and in India with a view to evaluate the underlying growth trends and instabilities in the share of the state in the country's total output of various fruits and vegetables. The current analysis finds the horticultural production in the state of Maharashtra to have grown much faster than the rest of the country for various fruits like grapes, oranges and cashewnuts. During 1981-82 to 1993-94 period, the overall increase in the grape production of Maharashtra was estimated to be nearly ten-fold having an annual compound growth rate of 25 per cent as against a mere three-fold overall increase in the output of this commodity with a compound growth rate of 11 per cent per annum for India. Similarly, oranges and cashewnuts produced in Maharashtra recorded more than a two-fold increase in their production levels during the same period even when the output growth of these high value fruits was observed to be rather very slow for the country as a whole. It is estimated that the share of Maharashtra in the country's total output of these commodities has grown at the annual rate of 12 per cent for grapes, 5 per cent for oranges and nearly 6 per cent for cashewnuts. These figures are indeed quite encouraging and show that the state of Maharashtra has great potential of boosting up the horticultural production in these valued commodities and thereby in increasing the state's share in the country's overall production of the same.

The study has revealed a declining trend in the share of Maharashtra in the nation's total production of banana and onions. Though the output levels of banana and onion have been increasing in Maharashtra, these have not kept pace with the rise in the country's total production. This is evident from the lower rate of growth for banana and onion production in Maharashtra than in India. The falling trend in the share of Maharashtra in the total national production of banana and onions could be construed as depressing since India has been in the forefront of export of these commodities for long and owing to the fact that these have been prized commodities of international horticultural export trade.

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An analysis of the decomposition of production increases revealed that the yield and the interaction between the area and the yield have a negative effect on the growth of onion production. In the case of banana, the area effect outweighed the yield as well as the interaction effects. These observations are indicative of the fact that the state of Maharashtra has had a rather poor productivity growth in these two crops.

The findings and estimates of this study indicate that the supply of fruits in India in general is likely to fall short of the domestic demand between the years 2001 and 2006. The fact that Maharashtra is the leading producer of various fruits and vegetables in India makes it imperative to launch concerted efforts in order to increase the productivity of various fruits and vegetables in general and banana and onions in particular. This is necessary if the gap between the demand and supply is to be bridged for these valued commodities and if significant production surplus has to be generated for export.

Impact of Fruit Cultivation on General Crops and Milk Production in the Punjab

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In the Punjab, only one per cent area of the total cropped area is under fruit orchards. Milk production along with horticultural plantations are the other activities which compete favourably with the general crops for the use of limited resources of the farmers and the fodder is currently occupying about 10 per cent of the total cropped area in the state. The study attempts to look at the future prospects of fruit cultivation and its potential impact on crops and dairying. The study was conducted in sub-mountainous region of Punjab State because its climate is conducive for fruit cultivation. Besides the appraisal of the existing production patterns of the sample farmers, normative programmes were computed for different farm size categories with the existing as well as with relaxed resource constraints. Linear programming technique was used to develop the rational programmes. Dairying and fruit orchards generate income over a number of years, so discounting cash flow technique was used to bring the returns of various activities on the same denominator.

The findings of the study conclusively pointed out that the existing returns from both kinnow and mango failed to warrant their entries in the optimum plans of the farmers both at the existing and at relaxed resource constraints. That is why none of the randomly sampled farmers has grown fruit orchards in the existing production programmes which were predominated by wheat, paddy and dairy activities. Undoubtedly, milk production has been integrated in production programmes of the farmers. Paddy and wheat are the main crops of the farmers. Kinnow and mango fruits at given cost-price-yield spectrum were relatively

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less profitable and could not figure in normative production programmes of the farmers even at the enhanced resource supply. That is why no sampled farmer had raised fruit orchards for commercial purpose. Further, optimal product-mix under an increased supply of critical inputs reflected that milk production was found to be more remunerative. Further, crossbred cows were found to be better milk producing animals because crossbred cows outstripped buffaloes in the order of profitability under intensive use of capital. In addition, dairying could be expanded only at the cost of area under paddy and wheat.

Furthermore, fruit orchards could be included in the production programmes with at least 25 per cent increase in returns on the large farms only, whereas a 50 per cent increase in returns was required to include orchards in the production programmes of the small and medium-sized farms. In fact, the expansion of area under orchards would be initially at the cost of area under paddy and wheat and at the later stage, it would negatively affect the dairy herd-size.

The findings of the study indicated a tremendous potential, especially on the small farms, for improving incomes and employment by making judicious use of borrowed funds. In addition, the efficiency in the use of scarce resources was enhanced with the increase in the farm size. Another upshot of this study was that the existing returns from fruit orchards were too meagre to warrant their entry in the production programmes of the farmers, which poses a challenge to the fruit production experts. They have to evolve high-yielding, disease resistant varieties along with machinery where almost no work had been done. Additionally, the policy makers have to come forward to make available cheaper inputs and improve and develop adequate infrastructure for the marketing of fruits in the country. Lastly, we have to educate the fruit growers about the latest package of fruit cultivation practices. Under given cost-price-yield scenario and the state of fruit technology, orchard cultivation does not seem to have much scope in the Punjab.

Prospects of Drip High-Tech System in Export Potential of Grapes in Maharashtra

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Maharashtra occupies 62 per cent of national grape area of which 44 per cent alone is in Nasik district. In order to study the economic benefits of the high-tech production technology of drip system, a study was conducted in Nasik district during 1996-97 covering a sample of 60 grape growers comprising 30 grape growers adopting conventional irrigation system and 30 with drip irrigation system. The results of the study revealed that the cropping intensity has increased from 180 per cent before drip system to 258 per cent after the adoption of drip technology, and the irrigation intensity of the grape growers has also increased more than one and a half times. By adopting drip system the area under grape cultivation increased from 16 to 35 per cent on the sample farms because of diversion and use of the saved water for additional crop area. The drip system involved heavy installation charges of Rs. 37,782

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per hectare, but the apportioned cost, depreciation, repairs, interest on fixed capital, etc., came to Rs. 9,823/ha per year.

The average per hectare cost of cultivation of grape worked out to Rs. 1.08 lakhs and Rs. 1.05 lakhs for conventional and drip methods respectively. Though there was an additional expenditure on drip installation, considerable saving was observed on cost items such as plant protection, irrigation, manures, fertilisers and human labour. In addition, as water is applied to root zones, it checked high humidity and reduced the incidence of pests and diseases. At total cost, there was a saving of Rs.2,781 per hectare as well as increased production of 8.79 quintals per hectare compared to conventional irrigation. It was reported that in drip system the fruit quality was better and highly acceptable in the markets and the grapes fetched better prices compared to the conventional method. The per hectare additional net profit received was higher by 37 per cent than in conventional irrigation. The benefit-cost ratio worked out to 1.39 and 1.53 for conventional and drip systems respectively. The internal rate of return on the cost of installation of drip system was 55 per cent which was highly significant. The per hectare and per year subsidy received worked out to Rs. 800 which was the bonus to the drip adopters in addition to the other economic benefits.

The knowledge and adoption indices for all components of technologies were worked out and was found to be high (87 per cent). In all, 69 per cent of the conventional method adopters faced the problems of shortage of irrigation water, production of export quality products and incidence of pests and diseases. It is concluded that drip system not only increased irrigation intensity but saved cultivation expenses and produced good export quality products. Thus the drip system needs to be introduced to a greater extent with government support. It is essential to develop pre-cooling units, infrastructure, export management training and promotion in grape growing areas.

Hops: An Import Substituting Horticultural Crop

D.V. Singh†

An attempt is made in the paper to study the economics of hops cultivation based on data collected in 1996 from a sample of 80 hop growers from two panchayats in Lahaul and Spiti region of Himachal Pradesh. It also highlights the problems and prospects of hops production in the state. The cropping pattern adopted by the sample growers revealed that the area under hops accounted for 2 per cent of the share of all crops grown by the sample farmers. The establishment of hop orchards requires high initial investment and maintenance cost. The maintenance cost of hop orchards varied according to the age of plants. The annual maintenance cost increases upto four years of the life of the plants and remains constant thereafter upto the economic life of the plants. The per hectare establishment cost of hop

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orchards on an average farm is estimated at Rs.1,32,000. The production from hop plants started after the attainment of one year of age and increased upto the age of five years and thereafter remained constant for almost the economic life of the plants, i.e., 30 years. The per hectare annual maintenance cost of plants of all ages on an average is estimated to be Rs. 74,429 and its average yield at 31 quintals per hectare. The average cost of green and dry hops is estimated at Rs. 23.94 and Rs. 115.76 per kg respectively.

Earlier the hops produced in the country were in great demand by the Indian brewery industry but after the opening of world trade and reduction of import duty on hops from 125 to 50 per cent in 1993 under India's economic liberalisation programme, the brewery industries found it easy to import cheap hops from foreign producers. For want of effective demand, the hops produced in the state was lying unsold for the last two years. Another reason for lack of effective demand is the quality and form of the product. The brewery industry requires hops in the form of pallets and powder and these are readily available in the international market at cheaper rates. Hops produced in India are not being converted into pallets or powder. Moreover, this is not possible for small size producers because it requires huge amount of investment to install processing plant for the purpose. Hops can play a vital role in strengthening the regional economy, provided the government takes steps to solve the marketing problems. Since the breweries prefer to buy hops in value added forms of pallets and oil extract, the government must set up processing plants for converting flowers of hops into pallets and oil extraction.

Diversification of Indian Agriculture through Tropical Fruits: Potential and Challenges

R.K. Singh and D.S. Singh*

The study attempts to assess the country's production potential of tropical fruits based on data available with the National Horticulture Board and Directorate of Economics and Statistics, Ministry of Agriculture and Co-operation, Government of India. It also discusses the factors influencing the development of tropical fruits and its future challenges for agricultural diversification. The data on area, production and productivity of various tropical fruits in India during 1991-92 and 1992-93 show an increasing trend in both area and production of all important tropical crops after the implementation of economic reforms in the country. India produces over 32 million tonnes of fruits as against the world production of 369 million tonnes and ranks third in the world next to Brazil and the United States of America. The rapid increase in the production of tropical fruits demands multi-dimensional diversifications - regionally, horizontally as well as vertically in the country. During the last three decades (1961-91) the area and production of fruit crops in the country increased by 172 per cent and 320 per cent respectively. At the all-India level, area, production and productivity of fruit crops increased by 11.52, 15.10 and 3.21 per cent respectively between 1991-92 and 1992-93. The study highlights the strategies for development in the different

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regions and suggests the need for giving impetus to fruit development in India by effective utilisation of wastelands on which the fruit cultivation is more economical and favourable. The study suggests that a strong investment climate and economic background for high value tropical fruits exports, commitment to competitive marketing strategies, marketing and production are needed to compete with other Asian countries.

Assessment of Energy and Cost Requirements for the Production of Vegetables and Other Crops in Madhya Pradesh

C.L. Thakur, N.K. Khandelwal and V.C. Singh†

The paper analyses the reasons for variations in energy needs and cost requirements for raising vegetables and other crops in two different agro-climatic conditions in the state of Madhya Pradesh. Two villages, namely, Sonsa (sorghum-wheat zone, representing the Gird region) and Singod (rice-wheat zone, representing Kymore Plateau and Satpura Hills) were selected in the year 1991-92 and 1992-93 respectively. A random sample of 50 farms each was selected from the two villages. The energy requirement for raising a particular crop in the same state varied considerably due to variation in the technology level adopted by the farmers and also because of diverse agro-climatic conditions.

In village Sonsa the values of total energy measured in mega joules requirements for various agricultural operations needed were higher in potato cultivation than in wheat, mustard, jowar, soybean and gram. Human labour requirement was maximum for potato crop as compared to other crops. The average yield of potato was the highest, followed by wheat, jowar, gram, soybean and mustard. The output-input energy ratio was the highest in gram (4.24) and the lowest in potato (1.03). The potato crop gave a higher net profit (Rs.30,655/ha) than other crops. The benefit-cost ratio was higher (2.81) in potato crop, followed by gram (2.78), wheat (1.42), soybean (1.35), mustard (1.09) and jowar (0.89) in village Sonsa Gird zone of Madhya Pradesh.

In village Singod the total energy and cost requirements according to different operations and sources were higher for the production of onion crop, followed by wheat, paddy, peas (grown for vegetable purpose), soybean and gram. Human labour constituted highly energy consuming source in onion production as compared to other crops. The average yield was maximum in the case of onion crop, followed by wheat, paddy, peas, gram and soybean. The benefit-cost ratio was the highest (3.00) in peas, followed by onion (2.90), wheat (2.81), gram (2.46), paddy (1.77) and soybean (1.13) in village Singod Kymore Plateau and Satpura

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Hills Zone of Madhya Pradesh. The results of the study indicate that in both the villages (Sonsa and Singod) potato and onion are the most important vegetable crops which give higher net profit per hectare than other crops.

Performance of Flower Crops vis-a-vis Field Crops in Madurai District, Tamil Nadu

T. Alagumani, M. Anjugam and R. Rajesh*

The present study was conducted in Madurai district of Tamil Nadu with the objective of finding out the factors responsible for increase in the area under flower crops and to assess the performance of flower crops in comparison with other field crops. Based on the highest area under flower crops, Nilakottai block was selected from which a random sample of 30 farmers was selected. The primary data pertaining to the year 1995-96 were collected by personal interview method. Percentage analysis, investment analysis and multiple regression technique were employed to derive meaningful conclusions.

In the study area the major soil type is red soil and the source of irrigation is well. The area under flowers per farm varied from 0.1 acre to one acre. The flower crops grown in the sample farms were rose, corssandra, jasmine, mullai, pitchi, chrysanthemum, kakaratan (Madras malli). The field crops grown were paddy, sugarcane, cotton and groundnut. The sample farmers have been cultivating flowers for the past 15 years. The income obtained from the flower crops was higher than the field crops. The profit from field crops, i.e., sugar was only Rs.24,298, whereas the profit was the highest in the case of flower crop of kakaratan, being Rs.9.47 lakhs per annum, followed by rose (Rs. 8.4 lakhs).

For flower crops male labour employment varied from 440 man-days in crossandra to 518 man-days in rose and kakaratan whereas in field crops it varied from 225 man-days for groundnut to 305 man-days for sugarcane. The percentage of family male labour use to total male labour use for field crops varied from 18 per cent to 48 per cent and for flower crops it varied from about 14 per cent for crossandra to 19 per cent for rose and kakaratan. Female labour employment was higher than male labour employment both in flower crops and field crops. Of the total female labour use, about 50 per cent was family labour in flower crops whereas it was less than 10 per cent in the field crops. Child labour was also used in flower crops. Since the flower crops require more labour for harvesting, the employment generation was more, especially for the family women, and child labour use was high for all flower crops.

Resource use efficiency analysis for jasmine crop showed that an increase in the area under jasmine by one acre would increase the output of jasmine by 507.76 kg and increase in the labour by one man-day would result in an increase in the yield of jasmine by 0.01 kg. One rupee increase in the expenditure on manures and fertilisers would increase the output by 0.3 kg. Similarly, one rupee increase in the cost of irrigation would increase the yield by 1.32 kg. The analysis indicated the scope for increasing the income by increasing the use

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of these inputs.

For all flower crops net present worth (NPW) was positive and the benefit-cost ratio (BCR) was more than one, indicating that capital investment on floriculture is more paying. Among the four crops considered, NPW for kakaratan was found to be the highest, followed by rose. The benefit-cost ratio was the highest for crossandra (6.00), followed by kakaratan (5.5). Based on the above findings it is concluded that floriculture is highly profitable as compared to field crops. Among flower crops, kakaratan was found to be most profitable.

Economics of Flower Production in District Farrukhabad, Uttar Pradesh

R.B. Singh, R.N. Prasad, H.K. Nigam† and R. Saran‡

Based on data collected from a random sample of 50 flower growers selected from five villages of Kannauj block in Farrukhabad district of Uttar Pradesh, the paper attempts to examine the place of flower cultivation in the cropping pattern and to work out the cost and returns of flower crops. The district is well known for flower cultivation and preparation of perfumes in the whole country. The findings of the study revealed that on an average the area under flower cultivation formed about 24 per cent of the total cropped area, followed by cereal crops (about 19 per cent), vegetables (10 per cent) and potato (9 per cent). The cost and return analysis shows that rose cultivation yielded a net income of Rs.1.3 lakhs per hectare on an average investment of Rs.11,000 per hectare and the input-output ratio came to 1:1.76. In the case of jasmine the average net returns came to Rs.1.04 lakhs on an average investment of Rs.97,430 per hectare and the input-output ratio worked out to 1:1.73. Size-groupwise analysis showed that the average cost incurred on these two flower crops was higher on big farms because of their better financial position for investment in flower crops. It was also observed that net returns were higher on big farms. The findings of the study indicated that flower cultivation has great potential for increasing income and employment of the farmers of the study area. It needs to be encouraged for the benefit of the farmers by providing them necessary production inputs and marketing facilities.

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A Scenario of Production and Export of Vegetables

D.S. Nawadkar, D.L. Sale, H.R. Shinde and D.K. Mahandule*

Of the total production of vegetables in the world in 1992-93, China ranked first, accounting for a share of 26 per cent, followed by India with a share of 12 per cent. However, the productivity of all kinds of vegetables in India is far below the other major producing countries. The share of Maharashtra in the country's area and production of vegetables is reported to be 3.87 per cent and 6.27 per cent respectively. The productivity of the vegetables in Maharashtra was higher than the productivity of India.

Maharashtra ranked third in the geographical area of the country. The state is classified into nine agro-climatic zones which provide an ample scope for growing different kinds of vegetables in different parts of the state. The present area under vegetables and productivity of vegetables should be increased by adopting improved agro-techniques and by increasing irrigation facilities.

The index numbers of area, production and productivity of important vegetables showed a continuous uptrend during the period of 43 years ending 1992-93. Since the year 1989-90 the quantum of exports of vegetables has increased tremendously but it is far below the country's potential. The area under vegetables in Maharashtra increased continuously by about 209 per cent during a span of 31 years starting from 1960-61. The productivity of chillies in the state lagged behind the nation's productivity. Though the area and production of potato increased, its share in the all-India area and production decreased whereas reverse was the case with respect to sweet potato and onion.

The results of the study indicated that there is a vast scope for vegetable cultivation in Maharashtra State not only by increasing the productivity but also by increasing its area. The increased productivity programmes should be associated with the development of agro-based industries. There is an urgent need for devising appropriate policy measures for enhancing production of export quality products. It is essential to plan a strategy for increasing the agricultural production in general and production of vegetables in particular.

An Economic Analysis of Winter Floriculture Grown in Vicinity of Nagpur City of Maharashtra

K.G. Agarwal and D.D. Duhijod†

With increasing demand for flowers for domestic use and export it has become absolutely necessary to examine the economic aspects of floriculture under mixed crop farming. A study of 54 respondents selected from three villages of two blocks in the vicinity of Nagpur city in Maharashtra for three flowers revealed that chrysanthemum growers have utilised land more efficiently using irrigation resource rationally for achieving maximum farm

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income. African marigold and chrysanthemum compete with irrigated cotton. The productivity of marigold, chrysanthemum and daisy was more than that of gallardia, wheat, soyabean and irrigated cotton. Marigold generates maximum female labour employment especially in picking of flowers in the early morning hours. Human labour cost accounts for 75 per cent of total input cost in marigold as compared to 45 per cent and 41 per cent in chrysanthemum and daisy respectively. Irrigation cost as a percentage of total input cost was also higher in daisy (40 per cent) as compared to marigold and chrysanthemum. Daisy flower yields the same benefit as chrysanthemum but the per kg cost is very low in daisy due to more physical productivity as compared to chrysanthemum

The study suggests that Maharashtra State Government should take the necessary steps to safeguard the interest of flower growers as well as consumers. A co-ordinated committee of members from the State Horticulture Department, Co-operative Marketing Department and Krishi Upaj Mandi Samiti may be formed to develop market infrastructure. A co-operative flower growers' society may be set up with scientifically developed infrastructure to minimise spoilage and to regulate the supply of flowers with demand. This institution should act as a competitor among private dealers and as an advisor to flower growers to adopt package of practices with respect to seed/cutting, application of chemical fertilisers and insecticides for attaining higher productivity of flowers. To accelarate the rate of adoption of modern techniques of flower production, demonstrations should be laid in the fields of small flower growers by extension workers of State Horticulture Department in collaboration with extension department of Agricultural University. Wholesalers and retailers of flowers should be provided with modern storage facilities by advancing loan at subsidised rates through financial institutions to regulate the supply of flowers in relation to demand.

Economics of Ber Production in and Around Hyderabad City of Andhra Pradesh

P. Chitra, I. Narender and K. Bal Reddy*

Recognising the importance of the production of ber in recent times, an attempt has been made to study the economics of ber cultivation in and around Hyderabad of Andhra Pradesh. The results in this paper are based on the data obtained from 15 farmers during 1994-95, who were selected within a 50 km radius around Hyderabad city which covers the three districts of Ranga Reddy, Mahboobnagar and Nalgonda. The profitability of ber cultivation was evaluated with the help of different investment appraisal techniques, i.e., pay-back period, net present value, benefit-cost ratio, annuity value and internal rate of return (IRR).

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The costs incurred during the pre-bearing and bearing periods and the returns were also analysed. The total cost of establishment in the first year was Rs. 7,913 per hectare. The total cost incurred during the maintenance was Rs.3,483 per hectare. The total cost of production of ber worked out to Rs. 16,737 per hectare.

The payback period in ber cultivation was 4.42 years and the benefit-cost ratio was 5.25, indicating the profitability of ber cultivation. The net present value worked out was Rs. 12,061. The IRR was 73.54 per cent which was higher than the lending rates of commercial banks. The results of the study indicated that even though ber cultivation required relatively higher initial capital investment compared to other fruit crops, the returns are higher during the bearing period and the profits are also relatively higher. Thus the economic indicators clearly indicated that the production of ber is economically viable.

Area, Production and Productivity Growth of Cashew in India with Special Reference to Its Export and Price

Debdutt Behura and Dibakar Naik†

An attempt is made in the paper (i) to study the growth of area, production and productivity of cashew in India; (ii) to analyse the export potential of Indian cashew kernel and (iii) to examine the global price structure and its impact on Indian cashewnut growers. The data on the area, production and productivity of cashew in different states of India and for the country as a whole pertained to the period 1965-66 to 1995-96. Compound growth rates of area, production and productivity of cashew, export of cashew kernels, total kernel production, domestic consumption and import of rawnuts were worked out using log-linear function. Among the horticultural commodities, cashew assumes immense commercial importance. The area under cashew has increased from 2.40 lakh hectares in 1965-66 to 6.35 lakh hectares in 1995-96, recording an increase of 160 per cent. On an average, cashew area in the country has increased by 1.53 per cent per annum during 1981-82 to 1995-96. Between 1965-66 and 1995-96 the production of cashew increased by 190 per cent from 1.44 lakh tonnes to 4.18 lakh tonnes. Kerala has the highest area under cashew (1.19 lakh ha) and is the largest producer of cashew, accounting for about one-third of the total cashew production in India. Compound growth rates of production of cashew in all the cashew producing states as well as in the country are positive and significant. The productivity of cashew in India is 720 kg/ha (1995-96) and Maharashtra has the highest productivity of 1,440 kg/ha. Negative productivity growth has been observed in the states of Kerala, Karnataka and West Bengal, due to existence of old senile plantations in these states. The productivity of cashew in India is increasing by 0.96 per cent per annum. About 48 per cent of the area under cashew plantations has become old and senile, contributing 32 per cent of the national output and the productivity is only 440 kg/ha. Necessary steps should be taken for gradual removal of these plantations to make way for replantations with improved horticultural practices.

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India is the largest exporter of cashew kernels in the global market, exporting 60-70 thousand tonnes per annum. During 1995-96, India exported 70 thousand tonnes of kernels worth Rs. 1,227 crores. The growth of export during 1981-82 to 1995-96 was 6.49 per cent. However, there has been fluctuating trend in the export of cashew kernels due to fluctuations in rawnut import. Since the installed capacity of the Indian processing units is unduly high, the processors are relying heavily on imports, thus draining out valuable foreign exchange. To bridge the gap between demand and supply, India has to increase its rawnut production by increasing the area under cashew with good planting materials and increased horticultural management.

There has been a gradual decline in the share of internal rawnut production to the total kernel exports due to increased import and also in the volume of exports to the total kernel production due to increased internal demand. Domestic production and import of rawnuts have significant positive impact on the export of kernels from India whereas domestic consumption has negative influence. Global price rise has significant positive impact on the export of kernels and the internal rawnut price increase. On the price front, Indian farmers are getting about 41 per cent less than the realisable value of rawnut and they are slightly in a disadvantageous position.

India's over-dependence on U.S.A. and Japan for exports has made it vulnerable to bargain for better price even with a quality product. So the main marketing strategies should be to strengthen the non-traditional markets and explore new ones along with maintaining good relationship with buyers in the traditional and established markets. Export of kernels in value-added form is meagre and attempts should be made to export value-added forms to ensure better price for Indian kernels. Efforts should also be made for utilising cashew apple for commercial exploitation which would help in generating more income and employment opportunities for the poor.

Horticulture in Andhra Pradesh: Production and Export Potentials

J. Krishnaiah*

The present study is taken up with the objective of assessing the potential of horticultural crops in terms of production and exports in different regions and at the state level in Andhra Pradesh and suggests strategies for further improvement. The required data are drawn from secondary sources. Andhra Pradesh ranks second in area and production of horticultural crops in India, next to Maharashtra. The state has vast potential for horticultural crops.

Among the different regions of Andhra Pradesh, Coastal Andhra has high potential and

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ranks first in the production of fresh fruits, lemon and other citrus fruits, total dry fruits, vegetables and flowers. Rayalaseema ranks second and Telangana third, except in the case of total dry fruits. In the case of mango, banana, cashew and lemon, Coastal Andhra leads other regions both in area and production while Telangana ranks first in the case of batavia. In respect of yield, Rayalaseema region ranks first. In the case of batavia, Telangana tops in yield.

During 1994-95, the exports of horticultural products from Andhra Pradesh were valued at Rs.115 crores. Among the items of high export value are coffee (39.83 per cent) and tapioca including starch and chips (16.36 per cent). To promote exports, the study suggests the need to concentrate on selected fruits, vegetables and spices in different regions in the state where these crops enjoy comparative advantage.

The policy implications of the study are that awareness should be created for horticulture and about its profitability vis-a-vis other crops. There is also the need to provide incentives and the needed infrastructure for procurement of surpluses, transport, storage, processing, marketing and export, to liberalise trade and to revitalise Agricultural and Processed Food Products Export Development Authority and other institutions for better performance.

Profitability of Ber Cultivation in Arid Region of Haryana

V.K. Singh and Jai Singh†

The present study was undertaken to study the cost and returns in ber cultivation and to compare the profitability of ber orchard with other competing crop rotations in Rohtak district of Haryana. The data for the study were collected from 50 respondents spread over six villages of Rohtak and Meham blocks in Rohtak district of Haryana, which constitutes an important ber growing district in the arid region of the state. The study pertains to the year 1992-93. Tabular analysis was used to work out the costs, returns, input use and yield levels and financial analysis was done to examine the economic feasibility of ber orchards.

The study revealed that the average operational holding of ber growers was 6.72 hectares, which was higher than the district average size of 2.62 hectares. The ber orchard area accounted for about 15.48 per cent of the operational area. The economics of ber production indicated that the net returns per hectare from ber orchards were Rs. 4,816 and the average cost of production of ber was found to be Rs. 114 per quintal and Rs. 6,746 per hectare. The returns per rupee investment in ber orchard was Rs.1.99. The financial analysis indicated that the investment on ber orchard is an economically viable activity. On an average, the internal rate of return was found as high as 40 per cent, with a payback period of 5 years and benefit-cost ratio of 3.53. Further, the ber cultivation emerged as a better paying proposition than any other crop rotation followed in the region. The findings of the study lead to the conclusion that ber cultivation has much potential as an economically viable alternative to existing crop cultivation. More emphasis is required to grow ber orchards in

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the southern part of the state having lesser irrigation facilities. The farmers should be provided incentives in the form of subsidised seedlings, fertilisers and credit for meeting the establishment costs.

Prospects of Fruits Cultivation in Canal Command Area of Bikaner, Rajasthan

Jitendra Singh, Atul Chandra and Anil Kumar*

In this paper, an attempt is made to explore the existing potential of fruit cultivation by examining the profitability and the sustainability imparting capability of fruit crops. The study was conducted in seven adjoining villages in the canal command area of Bikaner district in Rajasthan. The farmers were interviewed on the basis of pre-structured schedules relating to various aspects of fruit cultivation. The data were analysed by tabular method.

The study revealed that the farmers produced a variety of fruit crops on their farms without any scientific planning. The production practices followed by them are not in conformity with standard recommended package of practices. The study indicated large potential for cultivation of ber, pomegranate, aonla, morus, lime, dates and guava in the canal command areas of Bikaner. Substantial scope existed for fruit cultivation by the resourceful farmers having large holdings. The constraints faced by the farmers in regard to the cultivation of fruit crops such as problems relating to soil salinity, technical know-how, post-harvest handling, marketing, financial assistance, etc., need to be tackled to make fruits cultivation economically viable.

Post-Harvest Infrastructural Constraints to Horticultural Development

M.S. Jairath†

Despite remarkable horticultural growth in India, post-harvest management is very poor leading to substantial post-harvest losses. An attempt has been made to examine the post-harvest infrastructural constraints encompassing the horticultural sector and suggest policy measures for strengthening infrastructure in the North-Western Hill Region of India. The study is based on field level data collected during the year 1995. Information was gathered through a questionnaire on the aspects of production, human resources, credit and finance, storage, transport, packaging, market infrastructure and physical facilities provided in the

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market yard, market information, etc. Simple statistical tools were used for the analysis. Among the broad group of post-harvest infrastructural constraints presently encompassing the horticultural sector, market information and infrastructure are the most important constraints, followed by packaging. Among those close to overall average are storage, communication and banking and finance. Next in importance is the transport constraint. There is general lack of rapid transport system, refrigerated vehicles and availability of trucks during the season. Post-harvest technology is another infrastructural problem in order of importance.

The study suggests that the post-harvest infrastrucutre is the key area needing immediate attention. To translate this, the need of the hour is to promote State Infrastructure Development Corporation in the state. Concerted efforts should be made to create post-harvest facilities, promote innovation in packaging, improve roads to prevent damage of produce in transit, promote cold chain for fresh and frozen goods and develop air terminals for perishables. The state should set up an Horticultural Park to demonstrate expertise in the effective post-harvest handling techniques, improve packaging system and intensively educate the farmer about transport and marketing of the produce, design equipment for packaged and conveyance foods and develop quality control process. There is also the need to introduce export promotion strategies.The focus should also be on training and exposure on horticulture business right from growing, harvesting, packaging, processing, documentation, freight and marketing. To have systematic and sustained growth of fruits and vegetables in the state, command area growth centres which take stock of quality, quantity, season and duration of availability of produce and quality specification for end use should be established. The processing plants should be set up in different command areas and federated at the state level. National Fruit Processing Grid can channelise the essential inputs for the command areas plants through state grids and regulate supply of products for domestic as well as for export market. NRI capital should also be invited for horticultural development.

Profitability of Mango Cultivation in Drought-Prone Areas - A Case Study of Anantapur District of Andhra Pradesh

G.V. Krishna Rao, I.K. Srinivas and K.R. Chowdry*

An attempt is made to study the establishment cost, maintenance cost and cost of production of mango, the pattern of returns and income and also the capital productivity of mango cultivation in Anantapur district of Andhra Pradesh. Using multi-stage sampling technique a sample of five pre-bearing gardens and 20 bearing gardens under the age-groups 1 to 4 years were randomly selected from ten villages of Anantapur district, pertaining to the year 1993-94. Tabular analysis, cost concepts, income measures and discounting techniques were used to analyse and interpret the data.

The establishment cost (pre-bearing period) per hectare of mango garden during its first four years were Rs. 3,748, Rs. 2,029 and Rs. 2,102 and Rs. 2,452 respectively. During the

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first year seedlings, sowing and nursery accounted for about 32 per cent of the total establishment cost. The next important item of cost was irrigation with about 20 per cent of total cost. During the second year manuring, irrigation and inter-cultivation were the important items of the total cost, accounting for about 37 per cent, 30 per cent and 22 per cent respectively of the total cost. A similar trend was also observed during the third and fourth years. The annual maintenance cost, i.e., from fifth year onwards worked out to be Rs. 5,169. The major items of expenditure were manures, fertilisers, inter-cultivation, followed by plant protection and irrigation.

The cost of production per hectare of a mango garden was Rs. 17,828 out of which direct costs formed 33 per cent and indirect costs accounted for 67 per cent. The gross returns realised from the output of mango worked out to Rs. 22,083 per hectare. The net returns obtained by deducting the direct cost from the gross returns worked out to Rs. 16,194 per hectare. The farm business income, family labour income and farm investment income worked out to Rs. 14,161, Rs. 5,833 and Rs. 12,583 respectively.

The results of the capital productivity measures indicated that the investment on mango garden in this region was a profitable proposition. The investment can be recovered by the farmers in 11.5 years and the benefit-cost ratio was 1.46:1. The positive net present value indicated the soundness of investment made in the mango cultivation. The internal rate of return also indicated favourable nature of return. Since the level of the present returns from the mango crop is low, the extension agency may be geared up to educate the farmers on the importance of improved cultivation practices.

Area, Production and Productivity of Vegetables and Fruits in India

G.R. Patil[†]

An attempt has been made to explain the trends in compound growth rates of area, production and productivity of potato, onion, tapioca and banana in India. The study uses secondary data collected from Centre for Monitoring Indian Economy (1996) publication. The study is confined to the post-green revolution period, i.e., 1971-72-1994-95. Its main focus is on the comparison between two sub-periods, namely, period I covering the years 1971-72 and 1984-85 and period II - 1984-85 to 1994-95. During period I the compound growth rate of area under potato had increased much more than the area under banana, while the percentage increase in area under sweet potato was negligble and the growth rate of area under tapioca had declined. The percentage growth rate of production of potato was comparatively higher than that of banana, while that of tapioca was lower and sweet potato had negative growth rates. The annual compound growth rate of yield per hectare of potato was

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higher than that of the other vegetables. In the second period the annual compound growth rate of area of potato was lower than in the first period. Other vegetables, viz., onion and banana had registered higher growth rates of area than in the first period. Banana and tapioca registered a greater increase in yield per hectare than potato, onion and sweet potato.

During the first period, Gujarat, Punjab, Karnataka, Uttar Pradesh had higher growth rates of area under potato, and West Bengal, Assam and Karnataka were having higher productivity growth than the other states. During the second period Karnataka, Andhra Pradesh, Gujarat, Assam, West Bengal had registered higher compound growth rates of area, and Tamil Nadu, Rajasthan and Himachal Pradesh had indicated higher productivity per hectare of potato. The annual compound growth rates of area of sweet potato had been negative for all the major states except Gujarat, whereas Rajasthan, Gujarat, Maharashtra, Assam and Andhra Pradesh had indicated higher positive growth rates of production, and Assam and Madhya Pradesh had shown negative growth rates of productivity of sweet potato. Compound annual growth rates of area under onion were higher in Assam, Rajasthan, Maharashtra, Karnataka, Uttar Pradesh and Haryana, and Bihar, Rajasthan, Andhra Pradesh, Karnataka and Himachal Pradesh indicated higher growth rates of productivity of onion. Andhra Pradesh, Uttar Pradesh, Madhya Pradesh, Orissa, Tamil Nadu, Maharashtra and Kerala registered higher growth rates of area under banana and Uttar Pradesh, Gujarat and Madhya Pradesh and Tamil Nadu indicated higher growth rates of productivity of banana in the second period than in the first period.

Agriculturally developed states such as Punjab, Gujarat, West Bengal, Uttar Pradesh, Karnataka, Tamil Nadu, Maharashtra and Andhra Pradesh had higher yield per hectare than the national average yield in the case of potato, onion and banana. The development of fruits and vegetables is complementary to the overall development of the agricultural sector. The development of irrigation facilities, marketing infrastructure, cold storage and processing and provision of other inputs would go a long way in increasing the production of fruits and vegetables. As gross value of fruits and vegetables is higher than that of the other cash crops, the production of these crops should be encouraged by providing new high-yielding variety seeds and plants to the farmers. The farmers in the drought-prone area should be helped to take up the production of fruits by providing timely credit and marketing facilities.

Organisation of Production and Marketing of Apple in Himachal Pradesh: A Case Study of Kiari Village

S.P. Saraswat*

The paper investigates the process of production and marketing of apples in Kiari village which was purposively selected from Shimla district in Himachal Pradesh. The data on input use, production and marketing expenses and returns from apple from 50 households from the village were obtained by survey method for the year 1995-96. In Himachal Pradesh the area under apple has increased at a compound growth rate of 4.71 per cent per annum while the production increased at 8.34 per cent during 1966-67 to 1990-91. The Shimla district is

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the main producing area and contributes 71 per cent of the total state production. The study reveals that about 80 to 90 per cent of the total production of the state is exported outside the state. In the study area the average productivity per hectare of apple orchards is 1,285 standard boxes each of 18 kg. Apple cultivation is a very labour and capital intensive activity. The average maintenance cost of non-bearing orchard amounted to Rs.18,173 per hectare, while it was Rs.56,473 per hectare for bearing orchards. The input-output ratio at cost A is 1:4.73 while on cost C it is 1:1.46. Picking, grading and assembling are done by hand. On an average, the farmer incurred Rs. 26.72 on packing material including the cost of box which accounts for a major share of the cost of packing material. The bulk of the produce is transported to Delhi market by trucks. The channel used by most of the growers is producer-forwarding agent-commission agent-wholesaler-retailer-consumer. The analysis reveals that the producer's share in the consumer's rupee was 42.28 per cent. The marketing cost borne by the producer is 31.64 per cent of the consumer's rupee. Delhi market is the main market and more than 50 per cent of the total arrival comes from Himachal Pradesh.

The problems identified are mainifold and need to be eliminated through an efficient marketing system. Simultaneously for fetching remunerative prices, co-operative marketing should be encouraged so that the benefits may be distributed among the small growers, who constitute a larger section of the producers.

Cost Structure and Economic Potentials of Horticultural Crops in District Farrukhabad, Uttar Pradesh

Babu Singh, V. Prasad and S.R. Yadav[†]

The paper attempts to examine the crop composition adopted by the farmers and its main determinant factors and to work out the comparative advantage of different horticultural crops with other crops grown by the farmers in Farrukhabad district of Uttar Pradesh. The study is based on primary data collected from 60 farmers from six villages of three blocks of the selected district and pertained to the year 1995-96. The cost structure of different enterprises showed a great variation on account of their input requirements. In the case of horticultural crops like guava the cost per hectare per annum worked out to Rs. 11,667, mango Rs. 13,255 and roses Rs.14,205 (average for the first three years). In all the three crops human labour accounted for the highest share (nearly 27 per cent) in their respective total cost. In the case of potato and vegetable crop groups, the per hectare cost (C) was worked out at Rs.25,920 and Rs.8,110 respectively. In potato cultivation, seed cost was the highest (40.51 per cent) while in vegetables, human labour cost was as high as about 30 per cent. In cereals the total cost (C) came to Rs. 9,735 per hectare. The cost structure further

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revealed that the share of variable cost for fruits was lower than that of fixed cost (41-42 per cent) and in floriculture it was 54 per cent. As against this, the variable cost was higher in vegetables, cereals and potato crop, ranging from 60 to 81 per cent.

To measure the comparative advantage of different horticultural crops, net returns per hectare and income-cost ratio were worked out. The findings revealed that the comparative advantage lies in the production of mango, roses and guava, as their income-cost ratio and net returns are higher than cereals, potatoes and vegetable crops. The income-cost ratio in fruits and floriculture varied from 1:2.06 to 1:2.60, while their net returns varied from Rs. 12,333 to Rs. 21,745 per hectare per annum. In the case of cereals and vegetable crop groups, the income-cost ratio ranged between 1:1.13 and 1:1.25 only, restricting their net returns. Thus on the basis of the findings, it may be concluded that the production of horticultural crops has great potential for income generation and employment on farms. However, it calls for a determined policy to integrate production, marketing and export of horticultural products.

Effect of Expansion of Horticulture on Livestock Sector in District Varanasi, Uttar Pradesh

Hemant Kumar,* R.K.S. Kushwaha,† G.N. Singh† and C.P. Singh‡

The paper examines the effect of expansion of horticulture on the livestock sector in Chiraigaon block of Varanasi district of Uttar Pradesh. The study is based on an intensive enquiry of a sample of 50 cultivators, randomly selected from five villages in the Chiraigaon block of the district at five points of time, namely, 1970-71, 1975-76, 1990-91 and 1995-96. The selected farmers were categorised into two types of farming, i.e., traditional farming and modern farming. The years 1970-71 and 1985-86 are taken as the base years for traditional and modern farming respectively. The number of selected farmers and their total cultivated area increased after 1970-71 due to division of joint family and change in their economic status. The area under horticultural crops as a percentage of total cropped area increased from 26 in 1970-71 to 38 in 1995-96 while the percentage area under food and fodder crops declined from 74 to about 62 during the corresponding periods but the total cropped area under food and fodder crops in absolute terms increased at different points of time after 1970-71 due to higher intensity of cropping with the introduction of short duration high-yielding crop varieties and rational use of farmyard manure, fertilisers, irrigation water, pesticides, quality seeds, and machinery under the modern farm technology as compared to the base year. There was an increase in the area under horticultural crops of the traditional farmers while the area under food and fodder crops declined, because the level of input use and the combination of crop and milk production depended on the choice of the farmers and their family in the absence of modern farm technology.

The number of livestock was higher in 1970-71 than in 1975-76 on the traditional farms due to decreased area under food and fodder crops. Though the livestock increased in

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1990-91, it declined in 1995-96 as compared to 1985-86 on the modern farms. It was due to sensitivity of modern agriculture which depends upon comparative profitability. With more than 30 per cent of the net cultivated area under horticultural crops the number of livestock under traditional farming showed a decline between 1970-71 and 1975-76. With about 50 per cent of the total net cultivated area devoted to horticulture under modern farming, the number of livestock decreased due to some institutional framework, environmental and economic limitations in the adoption of modern farm technology. Despite this increase in the area under horticulture and decline in the number of livestock, there was an increase in the intensity of cropping in favour of food and fodder crops to maintain the livestock.

Profitability of Vegetable Crops in Chhattisgarh Region of Durg District

A.K. Koshta and M.R. Chandrakar[†]

This study has been undertaken in a major area near to Shivnath river of Durg district of Madhya Pradesh to examine the cropping pattern and cropping intensity in different size-groups of farms, the cost of input use and returns of vegetable crops, marketing cost, utilisation of labour in farm activities and the constraints in the production and marketing of vegetables. For the purpose of study the data were collected from a sample of 35 vegetable growers categorised into small growers (22) with size of holdings less than 2 hectares and large growers (13) with size of holdings above 2 hectares selected from seven villages around Shivnath river in Durg district. The data pertained to the year 1995-96.

The cropping intensity of small and large vagetable farms was 204 and 176 per cent respectively. The small farms allocated more percentage of gross cropped area in *rabi* and summer, whereas the large farms have more cropped area during *kharif*. The cost of production per quintal was the maximum for lady's finger and the minimum for ivy-gourd. The labour cost was more in all the vegetables except tomato, cauliflower and cucumber. Proportionately, the cost of seed was more for tomato than in other crops. Bottlegourd and cabbage are heavy feeder of nutrients; therefore, the percentage of input cost was maximum for fertilisers/manure. Marketing cost was maximum in ivy-gourd (39 per cent) and minimum in lady's finger (19 per cent). However, the total production cost of vegetables on per quintal basis showed a reverse trend. The cost-benefit ratio was the highest in cabbage and the lowest in lady's finger. The returns from ivy-gourd, cabbage and bittergourd were comparatively higher than those from other crops on per hectare basis, whereas per quintal returns are found to be high in the case of bittergourd, cucumber, cauliflower and cabbage

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crops. Therefore, it is suggested that the percentage of area allocated to the latter group of crops including tomato should be increased and that under brinjal and lady's finger should be reduced for maximising the profits. Large farms have yielded more output than small farms on per farm basis. Of the total input cost, human labour accounted for nearly one-fourth on per farm basis, followed by pesticides and fertilisers/manure.

The main constraints for the development of vegetable crops are poor quality of seed, lack of knowledge, imbalance in the use of fertilisers, selection of good marka of pesticides, scarcity of hired labour supply, lack of cold storage facility to fetch good prices for vegetables during the off-season, absence of regulated markets, non-availability of credit for acquiring infrastructural development in vegetable farms and malpractices in the marketing of vegetables, etc.

Horticultural Production: Prospects for Exports in the Context of Globalisation of Agriculture

V.N. Autkar,* S.J. Kakde,* U.J. Khedakar† and P.P. Khode‡

The paper attempts to examine the production of major fruit and vegetable crops in India and the prospects for exports. Secondary data were collected from published sources. Simple tabular analysis was used in the study. The major highlights of the present study are as follows. India is the second largest producer of fruits accounting for a share of 8 per cent in the world production. India occupies the first position in mango production with a share of about 51 per cent in the world market. Other fruit crops are banana, pineapples, peaches, plums and grapes grown in different parts of the country. India is the second largest producer of fruit crops, next to Brazil.

India accounted for about 13 per cent of the total vegetable production in the world. It is the second largest producer in vegetable production, next to China. The value of exports of fresh fruits and vegetables has increased by four times from Rs. 77 crores in 1982-83 to Rs. 317 crores in 1991-92. Mango, grapes, onion and potato are the major export earnings commodities.

As far as fruits and processing industries are concerned, the picture is disappointing. India is able to process less than 1 per cent of the total production of fruits and vegetables whereas other developed countries processed 70 per cent of their production of fruits and vegetables. Thus there is great scope for processing to earn foreign exchange by way of value-added product. For boosting the export potential of fruits and vegetables, farming needs to be commercialised. To fully exploit this opportunity, major reforms are needed on supply side factors such as induction of modern technology, use of fertilisers, expansion in irrigation, provision of infrastructure and credit facility for raising supply response. Besides this, non-availability of material at right time and unremunerative prices are the major constraints. In spite of abundance of fruits and vegetables cheap and effective packaging is the need of the day for encouraging export. For boosting export potential a major revamping

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of agricultural research system is required to enable it better develop location-specific technologies, and to upgrade the extension system so as to become more accountable to the farmers. To set right priorities for research by placing due emphasis on biotechnologies, flexibility in management and resource augmentation is also required.

Production Performance of Potato in District Farrukhabad (Uttar Pradesh)

T.R. Singh and Raj Kishore†

A study was conducted in Barhpur block in Farrukhabad district of Uttar Pradesh during 1995-96 to examine the cost and returns and relative profitability of two varieties of potato by the sample farmers with different size of farms, to analyse the problems faced by the sample farmers and to offer suggestions for improving the profitability of the crop. Multi-stage stratified random sampling technique was used to select a sample of 50 cultivators from five villages of Barhpur block in the district during the year 1995-96.

Generally two varieties of potato are sown in September and mid-October and harvested in January to March. The production performance of the two varieties of potato was worked out separately for Kufri Chandramukhi and Kufri Badshah. The average cost of cultivation per hectare for Kufri Chandramukhi variety amounted to Rs.19,778 and Rs.20,913 per hectare for Kufri Badshah. Both varieties of potato showed an increasing trend in cost of cultivation with increase in farm size due to higher use of input resources by the large farmers.

The average yield of Kufri Chandramukhi and Kufri Badshah varieties of potato was 206 and 228 quintals per hectare respectively. The gross income amounted to Rs. 33,008 and Rs. 36,119 and net income came to Rs. 13,300 and Rs. 15,206 per hectare for these two varieties of potato respectively. The average cost of production per quintal for the former variety was higher, being about Rs. 96 as compared to about Rs. 92 for Kufri Badshah. The average gross income and net income of Kufri Badshah were higher than those of the Kufri Chandramukhi variety, due to the higher yield of the former. So the cultivation of Kufri Badshah variety is more profitable for potato growers in the study area. A few suggestions are offered for solving the problems faced by the farmers.

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Status and Future Prospects of Indian Honey Export

S.K.Chauhan*

An attempt is made in the paper to examine the status of bee-keeping in India and analyse the production and export potential of Indian honey. The study also analyses the cost and returns from bee-keeping by 100 stationary and migratory bee-keepers. The findings of the study reveal that bee-keeping in India made progress under the aegis of Khadi and Village Industries Commission established in 1956 which helped to increase honey production upto 9,290 metric tons in 1990-91 with an average yield of 8.75 kg per colony. On the world honey map India did not figure among the first seven honey producing and exporting countries. China was found to be the number one honey producer and exporter in the world. Europe emerged the biggest honey consuming (importing) market with Germany holding the first place where the per capita consumption was estimated at 1 kg per annum against only 2 to 3 gm in India.

The analysis of the costs and returns from bee-keeping indicated that bee-keeping under migratory conditions was more beneficial than under stationary conditions; the former had an average yield of 40 kg per colony as against 16 kg in the case of the latter. High transportation cost and high cost of agricultural equipments are some of the constraints confronting the bee-keepers of Himachal Pradesh. The findings of the study call for strenuous efforts to step up the production and productivity of Indian honey so as to exploit the vast export potential. Efforts are needed to encourage migratory type of bee-keeping. For this migration sites and routes should be surveyed with the help of bee-keepers. Transport facilities should be provided at cheaper rates.

Marketing of Onion in Semi-Arid Regions of Rajasthan

B.L.Sharma and D.C.Pant†

The paper attempts to work out the marketing costs, margins of profit, producer's share in consumer's rupee and the problems faced by the onion growers in the marketing of onion in Sikar district representing the semi-arid region of Rajasthan. The study also suggests measures to increase the producer's share in the marketing of onion. Multi-stage random sampling technique was used to select a sample of 60 cultivators from four villages in Laxmangarh tehsil of the district. The data pertained to the agricultural year 1995-96. Four wholesalers/commission agents and four retailers were selected randomly from the regulated market prevalent in Sikar district where maximum quantity of onion is sold by the producers.

The study revealed that onion growers in the study area sold their produce through three marketing channels, viz., channel I: producer-consumer, channel II: producer-local traders-consumer; and channel III: producer-commission agent-retailers-consumer. The

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results of the study further revealed that onion producers sold their produce in March and the total quantity sold upto the month of June was about 90 per cent of the total stock available with them. Of the total growers, 75 per cent preferred to sell their produce to local traders, while 18 per cent of them sold their produce in the regulated market in Sikar. Only about 7 per cent of the farmers sold their produce directly to the consumer. Thus it was noted that in the marketing of onion the maximum quantity was routed through local traders and commission agents.

The marketing cost was the highest in channel III, followed by channels I and II. The per quintal cost of marketing of onion incurred by producer sellers was the highest in channel III, followed by channel I and channel II. The marketing cost incurred by onion growers was the lowest in channel II where local traders took delivery directly from the cultivators' fields. The study revealed that channel I is not used much in the study area. It is also noted that the share of local traders, retailers and commission agents in consumer's rupee was about 38 per cent, 24 per cent and 3 per cent respectively. It is evident from the study that inadequate storage facilities and lack of organisations like co-operative societies and lower price due to seasonal glut are the main problems faced by the onion growers in the study area. High cost of marketing and transportation are also some of the problems faced by the farmers in the study area.

It is, therefore, suggested that proper storage facilities should be created in the nearby areas to store the onion and avoid seasonal glut in the market. This facility will give more profit to farmers at a later stage of the season. Marketing facilities should be created in onion growing areas so as to reduce the distance in the marketing of onion. The government should also guarantee minimum support price for onion so that the prices do not crash during seasonal glut. This will provide more profit to the cultivators. In addition, the onion producers should be advised to form marketing societies and sell their produce only through them which will further maximise their share of profit.

Export Oriented Floriculture in India - Status, Constraints and Strategies

L.R. Sharma, A.L. Nadda and Preeti Sharma*

The major objective of this study is to review the status, assess the future prospects and identify specific issues needing focus for appropriate follow-up in the floriculture export trade. The study is based on the secondary data obtained from various published sources. In the world trade of floricultural products, India has a peripheral presence accounting for just 0.06 per cent in terms of value. The status of exports from India revealed that it has

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increased from Rs.5.13 lakhs in 1971-72 to Rs.57.8 crores in 1995-96, with an annual compound growth rate of 32.92 per cent. The periodwise analysis showed that during 1971-80, the export growth has been at a compound rate of 30.42 per cent per annum; 39.13 per cent during 1981-90 and 42.56 per cent per annum during 1991-96 period. This indicated that the growth in the export of floricultural products has been rising at an increasing rate during these three periods.

India's dismal performance in the world trade share is attributable to infrastructural, production, policy and logistic constraints. In the recent past, however, the thrust provided through government support has helped to some extent in scaling up the quality production and in the introduction of latest technology and high class varieties from abroad. There has been a significant increase in foreign investment and in the production of export quality flowers. In order to strengthen the export oriented floriculture in India, there is a need for a coherent strategy with major focus on speedy importation of hi-tech infrastructure, germplasm material, production technology, development of an effective distribution system, cool chain system, information circuit, service-cum-auction centres, human resource skills and intensive location-specific research on production and physiological aspects of flower cultivation.

Comparative Economics of Vegetable and Non-Vegetable Farms: A Case Study

S.K. Sharma, A.K. Gauraha and B.C. Jain[†]

The present study was undertaken to examine and compare the cost and return of crops, labour utilisation, disposal pattern and constraints related to production, marketing, processing, etc., and relative economics of crops of the vegetable and non-vegetable farms. A sample of fifteen vegetable growers and fifteen non-vegetable growers from four villages of Mungeli tehsil of Bilaspur district of Madhya Pradesh were purposively selected. Detailed information on different cost items, production, labour utilisation and disposal pattern of vegetable crops for the year 1994-95 was collected personally from the respondents. The study revealed that the cropping intensity was higher on vegetable farms (227 per cent) than on non-vegetable farms (165 per cent) due to assured source of irrigation in vegetable farms. On non-vegetable farms only canal irrigation (protective irrigation) facility was available. *Kharif* crops accounted for 44 per cent and 61 per cent of the area on vegetable and non-vegetable farms respectively.

In the summer season the area allocated for vegetable crops was less due to insufficient groundwater in tubewells and wells. The average cost was higher for tomato and paddy and the lowest for gram and lathyrus on vegetable and non-vegetable farms respectively. The cost of vegetable crops was four to five times higher than on non-vegetable crops. Net return and benefit-cost ratio were higher for chilly, followed by cauliflower on vegetable farms. Gram and paddy crops gave the maximum net return and benefit-cost ratio on non-vegetable

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farms. The average benefit-cost ratio on vegetable farms was lower than on non-vegetable farms as the vegetable growers did not get remunerative price for their produce in the market. The net farm income realised by the vegetable growers was more than two and a half times that of non-vegetable growing farmers. The average total labour utilisation on vegetable farms was three times higher than that on non-vegetable farms. Female labour utilisation on both the farms formed more than 50 per cent of the total labour use. About 63 per cent of the total quantity of vegetable production was sold to the wholesaler-cum-commission agent. On the basis of opinions of technical persons, farmers and local leaders the major constraints identified for production, marketing and processing of vegetable crops were lack of improved or high-yielding good quality of seeds, lack of appropriate package of practices for vegetable crops in the region, lack of co-ordination among the different departments, lack of technical staff, lack of crop specific training programme, lack of appropriate grassroot level planning, lower price of the vegetables, lack of processing facilities, cold storages, etc.

The study suggests the need to develop cropwise grower organisations (e.g., tomato growers organisation) in the region. In the initial stage these organisations may be formed through non-governmental organisations to avoid the negative feeling among the farmers about the functioning of government owned organisation. Government may support these organisations by providing technical, financial and incentives to strengthen them. These organisations will be helpful in providing inputs, finances, cold storage facilities, technical know-how, cropwise training and marketing of vegetables and may also plan for developing processing units at the village level.

Flower Power in Punjab

H.K. Bal and H.S. Bal*

The paper examines the prospects of flower cultivation, existing marketing policies/practices and the export potential of cut-flowers in the state of Punjab. The data base consists of a sample of 20 flower growers selected randomly from Ludhiana and Ropar districts of Punjab. These growers cultivated flowers under open conditions and catered to the domestic market and the flowers were of low quality. Gladiolus is well adopted by the Punjab farmers as it accounted for 60 per cent of the total sales turnover of Rs.1 crore from flowers. Flower cultivation is a highly profitable enterprise as compared to other food and cash crops. The flowers pass through fewer intermediaries (wholesalers, retailers). The big growers are sending their produce to Delhi. These growers have established contacts with retailers, institutional and ultimate buyers.

The data base also includes two exporters (100 per cent export oriented units) which

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have set up green houses to produce export quality flowers. The greenhouses have the state of the art technology for flower production under controlled conditions. But these projects are highly capital intensive. The SWOT(strengths, weaknesses, opportunities and threats) analysis of Punjab floriculture was also carried out. Favourable climatic conditions, low labour costs, availability of land for floriculture, import of technology and buy-back arrangements of foreign collaborators with Indian exporters are some of the strengths of Punjab floriculture. The exporters face the problems of storage and transportation bottlenecks, import duties, low yields and lack of tissue culture labs. Opportunities are great as the state is blessed with natural and strategic locational advantages, the government's keenness to boost floriculture exports, and the entry of corporate houses in floriculture exports. The only threat factor that Punjab's export trade in floriculture may have to face is tough competition from other developing countries such as Thailand, Columbia and Mexico. In spite of the weaknesses and the threats, the future of floriculture is very bright for Punjab and the country as a whole.

Role of Post-Harvest Management in Export of Mango of Saharanpur District, Uttar Pradesh

D.K.Singh†

An attempt has been made in the paper to examine the role of post-harvest management in the export of mango of Saharanpur district which has the largest area under mangoes in Uttar Pradesh. The state ranks first in the area under mangoes and second in mango production among the mango producing states of the country. A substantial improvement in the growth of production of mango in the district is noticed but a large proportion of its profit is appropriated by the intermediaries because of poor infrastructural faciilities and lack of organised marketing system. A substantial part of the production of mango of this district is lost due to poor post-harvest management. The major factors attributed to post-harvest losses in mango are due to rough handling of fruit during grading, assembling and packing. Considerable losses also occurred due to lack of proper transportation and storage. Microbial deterioration is also very common in harvested mango. Improper transportation accounted for over 37 per cent of the post-harvest losses, followed by packing, spoilage, assembling and grading accounting for 19 per cent, 17 per cent, 8 per cent and 6 per cent respectively. Besides, mango gets easily bruised and easily infected with various fungi during handling and transit. To reduce post-harvest losses, technical advisory services for grading, assembling, packing, etc., on par with international standards should be provided to the functionaries involved in the marketing of mango.

The main reasons for the low volume of foreign trade in mango from Saharanpur are insufficient number of cold storages, inadequate knowledge of post-harvest management and improper marketing system. Out of total export of mango of 25,414 tonnes in 1994 from the country, more than 85 per cent was Alphonso and Totapuri varieties of mango while

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only 32 tonnes were exported from Uttar Pradesh through Horticulture Co-operative Marketing Federation.

In order to encourage the export of mangoes produced in this district, the first and foremost step should be to popularise Dasheri mango in the international markets with Alphonso and Totapuri varieties. Special attention is also needed to improve the quality of mangoes through better use of post-harvest treatment. Hydro-cooling and use of cryogenic freezing are also essential. In order to provide a greater thrust to exports of horticultural products, the private investors should be invited to set up pre-cooling units, cold storages and packing houses in the district for reducing the losses and preventing deterioration in the quality of mango. The scope for export of mango from this district to Malaysia and Singapore is very bright. Therefore, financial and infrastructural facilities should be given under the provisions of Trade Liberalisation policy to the exporters and mango growers organisation to export mango from this district.

Regionwise Changes in the Area under Vegetable Crops in Haryana

D.D.Gupta, D.V.Singh and S.S.Guliani*

The study examines the changes and shift in the area under different vegetable crops in the eastern and western agro-climatic regions of Haryana during the period 1980-81 to 1994-95. The study is based on secondary data collected from Statistical Abstract of Haryana. The study revealed that in the western region and the eastern region the percentage of net irrigated area increased by 10 per cent and by 21 per cent respectively during the triennium ending 1992-93 over triennium ending 1982-83. During the year 1994-95 the percentage of net irrigated area was 72 and 91 in the western and eastern regions respectively. Regarding the changes and shift in the area under vegetable crops the study showed that 'other vegetables' accounted for nearly 90 per cent and 37 per cent of the total vegetable area in the western and eastern regions respectively. Overall, the total area under vegetables increased by 26 per cent in the second triennium over the first one. In the eastern region potato was the main crop occupying more than one-half of the total vegetable area. Similarly, the area under onion increased by 139 per cent during the second triennium and by 193 per cent in 1994-95 over the first triennium. On the whole, the area under vegetable crops went up by 24.41 per cent during the second triennium and by 27.91 per cent in 1994-95.

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Marketing of Grape and Citrus Fruits in Haryana

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An attempt is made in the paper to work out the marketing costs and margins for grapes and citrus (malta and kinnow) fruits. The study was conducted in Hisar and Sirsa districts for grapes and citrus for the period 1990-93. To study the marketing cost of grapes by the producer-seller a sample of 50 grape growers in different size-groups were selected randomly from two clusters of three villages each from two blocks of Hisar district. A similar procedure of sampling was adopted to study the marketing cost of citrus fruits. The study revealed that of late grapes and citrus (malta and kinnow) have come to be cultivated in the south-western parts of Haryana particularly with the advent of canal network system for irrigation, But during the last few years, there has been a stagnation in the area under citrus and a fast decline in the area under grape orchards. This can be attributed to the problem of marketing of the produce. The findings on the costs of marketing and margins for these fruits indicated that the producer's share in the consumer's rupee was around 50 per cent when the producer directly sold his produce in the market. However, if the crop is sold through pre-harvest contractor, the share of the producer in the consumer's rupee declined to about 40 per cent for citrus and as low as 29 per cent for grapes. However, the cost incurred by the functionaries involved in the marketing of fruits under reference seemed normal. The marketing margins charged by the middlemen were invariably higher which ranged from 14 to 18 per cent of the consumer's price for pre-harvest contractor and 28 to 32 per cent for the retailer. Thus the high margins of the intermediaries reduce the share of the producer in the consumer's price to the bare minimum.

The study suggests the need to enhance the share of the producer in the consumer's price of fruits by forming co-operatives with public intervention at the producer's level and at the district or secondary market level similar to that of milk co-operatives. The formation of fruit grower's societies at the primary level may improve the bargaining power of the producers and could reduce the other marketing costs incurred on account of large scale operations.

Marketing of Grapes through Co-operatives in Pune District

S.B.Dangat, D.V.Kasar and D.B.Yadav*

A study was carried out on marketing of grapes through co-operatives in Narayangaon area of Pune district of Maharashtra. There are three co-operative marketing associations formed by the grape growers in the area. Besides giving technical guidance to their members, these co-operatives arrange for transport and sale of grapes. A sample of 35 member grape growers was randomly selected from seven villages around Narayangaon and the data were

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analysed using simple tabular methods.

The average area per farm under grapes was 1.23 ha. The average grape production per farm was 33.63 tonnes (27.42 tonnes/ha). The growers had three varieties, viz., Tas-A-Ganesh, Sonaka and Sharad seedless. Tas-A-Ganesh variety constituted 55 per cent of the total area under grapes. The sample grape growers sold the produce in different markets, viz., Mumbai, Delhi, Ludhiana, Dubai and England through co-operatives as well as independently. About 16 per cent of the produce was sold in the garden itself. More than half of the produce was sold through co-operatives indicating the important role played by them in the marketing of grapes. More than 50 per cent of the produce was sold in Delhi and Ludhiana markets. About 23 per cent of the produce was marketed in Mumbai market. The export quantity constituted 3.73 per cent of the total produce marketed. The per kilogram cost of marketing of grapes worked out to Rs.6, Rs.7, Rs.12 and Rs.16 in Mumbai, Delhi, Dubai and England markets respectively. The average per kg gross price realised for grapes in these four markets worked out to about Rs.10.50, Rs.17, Rs.20, Rs.43 and Rs.55 respectively. Thus the net price realised by exporting grapes was three times more than that realised through the sale in the gardens. It is, therefore, essential that the grapes produced are of export quality. The technique of quality grape production needs to be made available to a large number of grape growers. The co-operative associations need to be encouraged for the marketing of grapes and necessary infrastructural facilities need to be created and strengthened.

Fruits and Vegetables: Rising Peoples' Craving

Arjun Singh, Rai Singh and Amir Singh[†]

The paper attempts to examine the production and export performance of fruits and vegetables and suggest strategies for enhancing the production and exports of the horticultural crops. The major fruits cultivated in India are mango (31 per cent), banana (26 per cent), citrus (9 per cent), apple (4 per cent), grapes (2.4 per cent) and other fruits (19.6 per cent). Major vegetables are onion, potato and tomato. Onion alone surpassed in production and exports among all vegetables put together. Mango, banana and grape predominate in the exports of fruits. But still only 0.02 per cent of total mango production was exported, so also other fruits. The value of onion exported increased from Rs.119 crores in 1992-93 to Rs.183 crores in 1993-94, which was quite satisfactory. Vegetable products and seeds valued at Rs.32.73 crores and Rs.23.80 crores respectively were exported in 1992-93. Various constraints were identified in the export of horticultural products like costly

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improper transportation, perishability and fragility of the products, voluminous nature, inadequate infrastructure, poor quality and obsolete processing facilities etc. The study suggests the need to strengthen research network in pre- and post harvestment management, infrastructure development, processing, etc. Eventually transfer of up-to-date well suited technology to producers and exporters and traders is needed.

Effect of Packaging Practices and Truck Transportation on the Quality of Mangoes

Ajay Verma and Om Prakash*

There is growing realisation towards the need for an efficient packaging and transport infrastructure for perishables in general and mango in particular. At present the mangoes are packed in wooden boxes for long distance transport by commercial public transport trucks. The paper seeks to examine the existing handling and packaging practices of mangoes, to quantify the effect of truck transportation on quality of mangoes and resulting losses and to suggest ways to prevent these losses. The aggregate losses due to transportation and all the other factors were estimated using analysis of variance method and the means were compared with the help of Duncan's multiple range test.

The study indicated that the farmers neither graded the fruits nor gave any treatment for enhancing the shelf life of fruits. The mangoes cv. Dashehari, packed in traditional wooden boxes, were transported on board on a commercial truck from Lucknow to assembly market at Delhi as per the practice being followed. During the transportation the boxes kept in bottom layers of the stack break down due to thrusts, load from above and vibrations resulting in deterioration in the quality of fruits. Maximum aggregate loss due to transportation was about 25 per cent in the bottom layer of the stack as compared with only 12 per cent in the top layer. The difference in losses in different layers indicates a relatively less load bearing ability of the boxes under the given conditions of trucks. The aggregate loss was about 18 per cent over the entire truck. The practice of overfilling of boxes was detrimental to mangoes. The data on losses indicated that the transportation by commercial trucks was not suited as it exerted lot of pressure, shock and vibration on fruits. The deterioration in the quality or loss of fruits could be reduced by following improved handling and packaging practices, designing alternate packages, e.g., corrugated fibre board (CFB) boxes and plastic crates. Keeping the requirements of the perishable items like mangoes in mind, specialised temperature controlled trucks for transportation would have to be designed. The fruits should be properly graded and the practice of overfilling of the boxes should be discontinued. The installation of packing lines incorporating fungicidal treatment of fruits at the production centres would increase the shelf life and reduce the losses.

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Economic Sustainability and Market Potential of Hi-Tech Floriculture in Himachal Pradesh

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The paper examines the economic viability and potential of hi-tech floriculture in Himachal Pradesh in the light of globalisation of agriculture. To meet the objectives of the study the data on propagation of ornamental plants and cut-flowers raised through advanced tissue culture as well as conventional method were derived from *in-vivo* and *in-vitro* flori-techniques through rigorous personal interviews of scientists/experts of Himachal Pradesh Krishi Vishwavidyalaya, Palampur and progressive flower growers of Kangra district in Himachal Pradesh. The primary data, pertaining to the reference year 1995-96, included exhaustive and detailed information on technical aspects, infrastructures, material inputs, capital investment, production and financial overview of flori-projects. In the case of tissue culture project high value and rare ornamental begonias and orchids, while for conventional cultivation method the cut-flowers like carnation and gladiolus were considered as these ornamental plants and cut-flowers have very high domestic and global demand. The pollution/dust free environment and diverse agro-climatic conditions of Himachal Pradesh have been found very conducive for growing a variety of cut-flowers, ornamental plants as well as disease free planting material. Further, the off-season nature of various cut-flowers ensures premium price to flower growers.

The study revealed that these flori-projects require substantial amount of long, medium and short-term capital investments. It was estimated that medium-term capital of Rs.13.24 lakhs is required to establish tissue culture lab, and short-term capital of Rs.2.77 lakhs was needed to purchase chemicals, inputs, etc., to start tissue culture project for producing about 2 lakh plants of begonia and orchids annually. On the other hand, for cultivation of cut-flowers like carnation and gladiolus on one hectare of land, the grower would need Rs.12.50 lakhs as long-term capital for the purchase of land and its development, Rs.10.17 lakhs as medium-term for buildings and other infrastructures and Rs.1.23 lakh as short-term for purchasing the recurring inputs. In spite of huge amount of capital and *pro-tanto* high cost of production, both types of flori-projects were found economically sustainable and viable in terms of net income, break-even output, return over capital and repaying capacity. Thus by patronising the flori-projects of given size, type and dimension in Himachal Pradesh, the entrepreneur would earn an annual net income of well over Rs.3 lakhs. However, tissue culture project was found more superior and profitable over the conventional method both in terms of net income and rate of return over capital. The break-even analysis and comfortable repaying capacity of a florist further demonstrated the financial soundness of the hi-tech floriculture.

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The study also highlighted the domestic and global market potential of flowers raised in Himachal Pradesh. The study noted various constraints like lack of basic infrastructures, non-availability of desired planting material, marketing discrepancies, etc., thwarting the flower industry to flourish. A number of policy measures like creation of infrastructures, encouraging export-oriented estate flower farms, liberal financing, super-sensitive market intelligence,setting up Flower Export Promotion Council (FEPC), etc., are needed to promote production and export of flowers in the country.

Techno-Organisational Characteristics of Floriculture in West Bengal

Kazi M.B. Rahim and Debashis Sarkar*

The study attempts to examine and assess the problems and prospects of growing non-conventional export commodities, viz., floriculture products in the state of West Bengal. The study was conducted in two blocks of Midnapore district of West Bengal at the micro and macro levels. Primary data were collected from a sample of 40 flower growers in the district. The input-output ratios for the crops showed that flowers have an advantage over traditional crops like paddy and potato. High cost of inputs and low prices of output, non-availability of cold storage/warehouse facilities, high infestation of pest/disease, inappropriate seed germination, etc., were the major constraints faced by the flower growers in the study area. For boosting floriculture production the study suggests greater adoption of improved floricultural practices, involvement of scientists in releasing new pest/disease resistant varieties, improvement in the marketing systems, provision of credit, liberal import of new floriculture technology, making technical know-how available at the door step of the flower growers in a more organised way and assuring remunerative prices to the flower growers.

Economics of Cultivation of Horticultural Crops vis-a-vis Other Crops

P.V. Thorve, A.M. Dhope and Neelima Choube†

The paper studies the labour requirement for horticultural vis-a-vis conventional crops and compares the performance of horticultural and other crops in terms of gross income and profitability in Vidarbha region of Maharashtra. The crops selected for the study were banana and orange among horticultural crops and hybrid cotton, soyabean and paddy among conventional crops. The data on cost of cultivation for these crops were collected from 325 farmers under the Agricultural Prices Scheme of the Government of Maharashtra pertaining to the year 1995-96. The data were analysed using simple tabular methods and weighted

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averages were worked out for estimating per hectare labour use, cost and returns for horticulture and other crops. The study revealed that the horticultural crops required 129 male labour days per hectare as against 35 male labour days per hectare for the other crops. Female labour used for horticultural crops was, however, less being 48 days per hectare as against 74 days for the other crops. The higher male labour requirement for horticultural crops is due to the operations like irrigation and garden watching which are highly labour intensive. The profitability of horticultural crops vis-a-vis the other crops was studied through the net return and the output-input ratio. The results of the analysis indicated that the cultivation of horticultural crops is highly profitable in terms of net return and output-input ratio.The per hectare net return for horticultural crops on cost A basis was Rs.14,450 as against Rs.6,219 for other crops and the output-input ratio was 2.29 and 2.24 for horticultural and conventional crop groups respectively.Thus judged from both the criteria, the cultivation of horticultural crops is more profitable than the other crops. The study thus indicates that the horticultural crops being labour intensive have great potential to create employment opportunities in the rural areas.

Comparative Economics of Floriculture in Sonepat District (Haryana)

Pawan Dahiya, S.K. Goyal and R.N. Pandey*

The paper attempts to examine and compare the economics of cultivation of major floricultural crops and their competing crops in Sonepat district of Haryana. The study is based on primary data collected in 1995-96 from 20 marigold growing and seven gladiolus growing farmers from Rai block of Sonepat district which has the largest area under floriculture crops. The study revealed that under the present production technology and relative price structure, marigold was found to be considerably more profitable (net return Rs. 20,295/ha) over its competing crops, i.e., paddy (Rs. 9,827/ha) and arhar (Rs. 3,380/ha). Similarly, gladiolus was also found to be highly profitable (net return Rs. 78,808/ha) over its competing crops, i.e., mustard (Rs. 3,958/ha) and wheat (Rs. 1,372/ha). Due to lack of demand for flowers throughout the year, there exists a very high degree of price risk. Also, flowers being a highly perishable commodity, it require very quick and efficient transport and marketing system. To make the commercialisation of floriculture a successful venture, in this context, necessary steps need to be taken to ensure efficient production and marketing system through appropriate policies for streamlining the production technologies, inputs supply system, transport, processing, storage, export promotion, extension advisory services, etc.

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Ivy-Gourd Production in Durg District of Madhya Pradesh: An Economic Analysis

S.P. Gupta and J.S. Verma†

A study was undertaken in Durg district of Chhattisgarh region in Madhya Pradesh with a view to examine the cropping pattern, cost of production and marketing and returns from ivy-gourd production and the problems faced by the farmers during the production and marketing of the produce. It is based on primary data collected from 37 ivy-gourd producers from ten villages of three blocks, namely, Dhamdha, Patan and Durg. The study revealed that the cropped area was the highest in the *kharif* season while it was the lowest in *zaid*. The total cropped area was 10.85, 12.38, and 16.71 hectares and the cropping intensity was estimated as 232, 189 and 224 per cent on the small, medium and large farms respectively. The area under cereal crops was not more than 18 per cent in any farm size-group.

The study showed that the material used to prepare the structure, net making, labour charges and land rent were the most expensive cost items of fixed cost. The combined expenditure on these items under iron, iron+wood, cement and cement+wood bowers accounted for more than 85 per cent of the total fixed cost. Manuring and fertiliser application, plant protection and harvesting are found to be very important variable cost components constituting about 85 per cent of the total variable cost. Planting the material, irrigation and interest on working capital are other operations included in the variable cost. Transportation cost and commission charges constituted 70 per cent of the total marketing cost, followed by packaging material and labour charges. Total marketing cost formed about 33, 41, 39 and 40 per cent of the total per hectare cost of production under the four types of structure. Thus the marketing cost played a key role in deciding the scale of ivy-gourd production.

The highest net returns were realised under iron+wood bower while it was the lowest in the case of iron bower. The input-output ratio was estimated at 1:1.24, 1:1.66, 1:1.46 and 1:1.65 in iron, iron+wood, cement and cement+wood bowers respectively. Farmers reported that severe attack of stem borer, fruit borer, powdery and downy mildew, red spider mites and red beetle on the crop and scarcity of farmyard manure and high-yielding varieties of crop affected crop production adversely. They also perceived about the lack of approach road up to the market, lack of local demand and delayed payment for their produce in the market.

The study suggests the need to provide adequate credit to the producers as the crop is highly capital intensive. The technical know-how should also be given to them to control the severe infestation of diseases and pests. Some improved and disease resistant varieties should also be evolved in order to raise the production of the crop. Steps should also be taken to regulate the vegetable trade in order to reduce the dominance of commission agents in vegetable marketing which is possible by the government.

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Vegetable Production in India - Need for a Total System Approach

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Keeping in view the role of vegetables in providing health security to the people, the study attempts to identify the constraints in increasing the productivity in vegetables and suggests strategies to raise output and improve the quality of vegetables required for the national and international markets. The data for the study were collected from secondary sources. The study reveals that the availability of vegetables in India is now 140-145 g/head/day. According to Indian Council of Medical Research standards, the stipulated requirement of 300 g/head/day can be achieved only by 2025 A.D. as formulated by our planners subject to the total area under vegetables being 10 million hectares, productivity level is 30 tonnes/hectare and the total production is 300 million tonnes/year.

The total area under vegetables is hardly 2 to 2.5 per cent of the total cropped area. It has been observed that there is a wide gap in the productivity of vegetables at the state level. The productivity can be increased by the application of new hi-technology. In this study we also find that there exists a wide gap in productivity between average farms and co-ordinated projects in India. The major constraints which hinder the vegetable production are low priority in planning and non-availability of reliable area, production and productivity statistics, low productivity owing to low supply of inputs such as quality seeds, plant protection chemicals and inefficient marketing systems involving huge post-harvest losses.

For increasing the productivity and improving the quality of vegetables required for national and international markets, proper attention should be paid at different levels. There is, therefore, the need to develop infrastructure and processing facilities, increase the production of hybrid seeds and good traditional varieties of seeds, set up warehouses with cold storage facilities to preserve the material during glut seasons, strengthen refrigerated facilities and provide quick, efficient and cost effective transport systems. The possibilities of fixation of floor prices for at least important vegetables should be studied and implemented by State Governments to ensure that the producers are assured of remunerative returns for their investments. Still the existing system needs to be streamlined and the co-operative societies facilities need to be extended to the grassroot level. To provide relief to growers in case of natural calamities causing destruction of crops, the Government must evolve a specific crop insurance scheme. The participation of women in the production and processing must be ensured. There is good scope for setting up processing units for processing of vegetables.

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Comparative Economic Performance of Horticultural Crops and Other Crops with Special Reference to Varhedarna Village (Nasik District)

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Due to modern technology crop yields are increasing year after year. The farmers sometimes grow crops irrespective of their comparative economic performance and such action puts them into financial loss. Hence, it was decided to evaluate the comparative economic performance of horticultural crops and other crops in terms of factor productivity, profitability, stability and labour use. Thirteen orchardists (case studies) were selected randomly from Varhedarna village of Niphad taluka in Nasik district of Maharashtra. The village is progressive, with the population having better educational status. The land is irrigated. Almost all sampled orchardists installed drip irrigation sets in the grape orchards. Credit facility is available to farmers. Farmers use improved seeds/variety, apply chemical fertilisers and protect the crops from pests and diseases. The average size of holding of the selected small, medium and large orchardists were 1.23 ha, 2.38 ha and 5.15 ha respectively. Overall the average size of holdings was 2.92 ha. Similarly, the average size of family was 5.7 adult units. The sampled orchardists cultivated grapes and sugarcane perennial crops and vegetable crops in both the seasons and wheat in the *rabi* season. On an average, the area under grapes was 1.01 ha. The important vegetable crops grown are tomato, cauliflower and other vegetables. The profit per hectare at cost A level for grapes and sugarcane was the highest at Rs. 1.20 lakhs and Rs. 1.19 lakhs respectively and that for tomato, other vegetables and cauliflower was Rs. 37,227, Rs. 11,225 and Rs. 6,723 respectively. The profit realised from the cultivation of wheat amounted to Rs. 7,639 per hectare. It is suggested that the farmers should put more area under horticultural crops and satisfy their foodgrain needs by purchasing them from the open market. Such policy will maximise their total farm profit per year. Similarly, constraints like shortage of funds and shortage of labour can be solved by following scientific credit management practices, i.e., mainly spending the borrowed amount for productive purposes and repaying the loan in time. Similarly, landless labourers from dryland agricultural areas can migrate temporarily to this area if remunerative wages are paid to them. Sometimes, orchardists face market glut and this problem can be solved by providing more storage facility, especially by voluntary agencies.

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Production, Consumption and Processing Scenario of Fruits and Vegetables in India

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An attempt has been made in this paper to examine the production, consumption and processing of fruits and vegetables in India. The statewise growth rates of area, production and yield of fruits and vegetables are worked out to examine the spatial and temporal horticultural development in India. The total production and requirement for fruits and vegetables are also worked out. The data for the present study have been collected from secondary sources. The study reveals that the growth rates of area and production were positive and higher for the aggregate fruits in comparison to aggregate vegetables, but the yield growth rate for fruits was negative while for vegetables it was positive between 1991-95. It was noted that three fruits, namely, banana, citrus and mango accounted for 64 per cent of the area and 68 per cent of the production of fruits in India during 1991-92. Similarly, four vegetables, namely, potato, onion, tomato and brinjal occupied 35 per cent of area and accounted for 53 per cent of the production of vegetables in the same year. However, in 1994-95 both the area and production of fruits decreased but for vegetables there was an increase as compared to 1991-92. It was noted that Andhra Pradesh, Bihar, Karnataka, Maharashtra and Uttar Pradesh accounted for a share of 52 per cent of area and 55 per cent of production of fruits in 1994-95. On the other hand, Bihar, Orissa, Uttar Pradesh and West Bengal were the main vegetable producing states which occupied 59 per cent of the area and contributed about 56 per cent of production of vegetables in India.

The consumption of fruits and vegetables was higher by one and half times in the urban areas than in the rural areas in 1987-88. It was noted that consumption of all vegetables in the rural areas increased during 1987-88 to 1993-94 except for brinjal. The consumption of fruits and vegetables increased remarkably both in the urban and rural areas during the same period. It was estimated that if the same trend of area, production and yield continued in future the fruits production will become surplus by 7.90 million tonnes by the turn of the 20th century, which would further increase to 19.67 million tonnes for fruits and 13.64 million tonnes for vegetables in the year 2005-06, after meeting the requirements of 120 grams of fruits and 250 grams of vegetables/capita/day and without considering the losses. Processing capacity created for processing of fruits and vegetables increased from 0.27 million tonnes to 1.4 million tonnes between 1980 and 1994. This capacity was sufficient to process hardly 1.32 per cent of total production in 1994. However, due to lack of infrastructural facilities and processing capacity, almost one-third of total fruits and vegetables production worth Rs.5,000 crores are lost annually. This could be saved through processing and preserving these crops well in time. The processing industry should be

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encouraged to utilise the production of these crops for generating income and employment in the rural areas in a planned way. Incentives should be provided for investment in this sector.

Status and Prospects of Minor Fruits in Vidarbha Region of Maharashtra State

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The study seeks to assess the present status, to find out the districtwise performance and to examine the prospects of traditional and exotic minor fruit crops in Vidarbha region of Maharashtra state. The study covered all the nine districts of the region. To assess the present status and districtwise performance an extensive survey was conducted all over the region, both by making personal enquiries with the traders, itinerant merchants, fruit assemblers, growers, talathis, etc., and also by eliciting information from District Horticultural Officers, wholesalers, commission agents and by personal visits to the fruit markets. For studying the prospects of minor fruits, data were collected from 53 taluka Agricultural Produce Market Committees (APMCs) and nine district APMCs in addition to 76 minor fruit producers. Five functionaries from each market, wherever available, were selected. The results of the study are based on the data collected from 386 personnel engaged in the marketing of minor fruits. The data were collected with the help of enumerators working under the Agricultural Prices Scheme and pertained to the agricultural year 1995-96.

It was observed that the area under minor fruit crops in the region was 7,095 hectares, constituting 0.12 per cent of the gross cropped area of the region. Ber, custard apple and pomegranate covered about 90 per cent of the area under the minor fruit crops. The total volume of trade in minor fruits in the region is estimated at Rs. 51 crores, which accounted for 89 per cent of the total trade of minor fruits in the region, indicating thereby that the share of remaining minor fruit crops in the area as well as in the trade is negligible. The districtwise analysis also depicts that many non-conventional fruit crops are being totally neglected among the minor fruit crops. The minor fruit crops can serve as one of the sources of income to tribal and poor people. Being very sturdy, these crops can be grown on the culturable wasteland and lands under the miscellaneous trees and groves not included in net sown area, constituting 3.23 lakh hectares in the region and 11.82 lakh hectares in Maharashtra State. Location-specific analysis indicated better prospects for these non-conventional fruit crops if systematic planning is made through employment guarantee scheme linked horticultural programmes.

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Comparative Performance of Private Trade and Co-operative Societies for Vegetables in Bihar: A Case Study

Jagdish Prasad*

The paper makes an attempt to examine critically, on the basis of empirical data, the performance of private trade and co-operative marketing institutions in the marketing of vegetables and to identify the problems and prospects of vegetable marketing as well as to suggest suitable strategies for improving the efficiency of vegetable marketing. The study is mainly based on primary data collected from a random sample of 72 vegetable growers and two co-operative marketing societies in the Ranchi district of the plateau region of Bihar. The methodology adopted for examining the marketing efficiency is the marketing margin analysis. The study reveals high marketing costs, large price spread and low grower's share in private as well as co-operative marketing system. The organisational structure and asset and financial management were found to be weak and poor in the primary growers societies studied. The inference may be drawn that the government's indirect intervention particularly through regulation of markets has not shown perceptible effects on improving private vegetables marketing system. Co-operatives have also failed in protecting the interests of vegetable growers. The study suggests for a rationally modified and clearly spelt out government policy with a view to facilitating regulatory measures as well as co-operative marketing societies to protect the interest of vegetable growers. A new plan of investment in developing vegetable markets both at the sub- and main marketyard levels and the creation of adequate transport and storage facilities would facilitate in improving the vegetables marketing system in Bihar. Besides, integration of regulatory measures with that of co-operative marketing societies should be strengthened with both credit and marketing linkages.

Economics of Production and Marketing of Banana in Gorakhpur District of Uttar Pradesh

Anil Kumar Singh, S.P.R. Chaurasia and L.R. Singh†

The study examines the costs and returns of banana production and works out the marketing costs and margins of various functionaries dealing with banana fruit. The study is based on data collected from a random sample of 60 farmers selected from three villages in Campiarganj block in Gorakhpur district of Uttar Pradesh, pertaining to the year 1994-95. The average area per farm under banana cultivation was 1.3 hectares. Two varieties of

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banana, namely, local (Ram Bhog) and Harichhal are grown in the study area. The local banana is inter-cropped with paddy in *kharif* and wheat or pea in *rabi* during first year only. No inter-cropping was practised in Harichhal banana. The average yield per hectare of local banana was 355 quintals and that of Harichhal 445 quintals. The per hectare gross returns from local banana (excluding returns from inter-crops) amounted to Rs.49,387 and the net returns Rs.21,393. The net returns from local banana with inter-cropping of paddy and wheat or paddy and pea were Rs.27,513 and Rs.27,431 respectively, with the input-output ratio varying from 1.64 to 1.69. The gross and net returns from Harichhal banana were higher than those from local banana, being Rs.96,565 and Rs.43,059 respectively with an input-output ratio of 1.80. Thus Harichhal banana appeared to be more remunerative than local banana with inter-cropping pattern of cultivation.

The major part of the produce was sold by the producers through pre-harvest contractors (77 per cent), followed by village traders. The per quintal average price received by the producers ranged between Rs. 139 and Rs. 165. The price received by the commission agent-cum-wholesaler varied between Rs. 215 and Rs. 276 per quintal while village traders and pre-harvest contractors received Rs. 176 and Rs. 215 per quintal respectively. There was great variation in the marketing cost which primarily depended on the distance, mode of transportation and other charges to be paid in the mandi. It ranged between Rs. 13 to Rs. 46 per quintal. Similarly, the market margins also ranged between Rs. 22 and Rs. 62 per quintal. The results of the study indicated that banana cultivation in the study area may prove profitable if the farmers try to sell their produce by forming some organisation on voluntary basis and thereby realise the benefits of large scale business. There is immediate need to strengthen the transportation means in the area which would help in disposing of the produce to distant markets at better price.

Comparative Performance of Fruit, Vegetable and Cereal Crops in High-Hill Farming System of Uttar Pradesh

R.S. Tripathi*

The study attempts to examine and compare the economics of apple production, i.e., costs, returns and benefit-cost ratio with those of off-season vegetable pea-potato and millet-wheat rotations and also estimate the productivity of important input resources used for the production of these crops at the existing level of production technology and resource use pattern of hill farming system in Uttar Pradesh. The study was conducted in two villages of Tehri Garhwal hills of Uttar Pradesh. All the farmers cultivating apple, off-season vegetable pea and potato on a commercial basis and cereal crops were selected from the two villages in the agricultural year 1994-95. Linear and Cobb-Douglas production functions were used to examine the productivity of input factors.

The intensive enquiry revealed that human labour employment per hectare per annum was the highest in vegetable rotation (potato-pea), followed by cereals (millet-wheat) and

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it was the lowest in apple cultivation. Bullock labour use was relatively higher in cereals and vegetables.The use of manure was the highest in vegetables, followed by cereals whereas it was the lowest in apple cultivation. The same trend was noted in the use of chemical fertilisers. Use of plant protection measures was not common in the area and very little quantity of this input was applied to crops under reference. It reflects the fact that the off-season vegetables received top priority in regard to resource use and fruit attracted the least attention of the farmers in the high-hill farming system because of low and unstable yield of apple fruits and uncertain return from the apple production due to severe incidence of insects, pests and diseases in the orchards. Defective layout of the orchards, inferior and genetically poor cultivars, self ripening in many apple varieties, poor orchard management and insufficient production and marketing infrastructure were also responsible for low yield of apple which ultimately resulted in improper attention given by the apple growers to fruit production. The operational cost, i.e., cost A1 was the highest in vegetable rotation as compared to the cereals. The same trend was noted in the case of cost B and C. On cost C2 basis, the total cost of production was the highest in vegetables, followed by cereals and apple.The per hectare yield and net returns on cost A1 basis were the highest for vegetables, followed by cereals and apple. On cost C2 basis, only vegetables yielded the highest net returns of about Rs.16,600 per hectare per annum as compared to a net loss of Rs.2,030 and Rs.4,320 in apple and cereal production respectively. The study showed that off-season vegetables have higher absolute advantage over fruits whereas apple has slightly better advantage over cereals on cost C1 and C2 basis.

Regression analysis indicated that returns from apple production can be raised through increased use of improved seed materials and more human labour on the orchards. Application of the minimum required quantity of plant protection measures and fertilisers would certainly improve the yield and returns of the fruit. There is tremendous scope to increase the returns from vegetables through more investment on manure, fertilisers and seed and seed material whereas the returns from the cereal crops can be increased by increasing the investment on plant protection, seeds and human labour at the prevalent farming pattern of the high hills. The study also suggested that consideration must be given to develop at least a minimum supporting infrastructure, institutional arrangements and availability of input supply services in the area.

Horticultural Development in Himachal Pradesh: A Case Study of Apple Cultivation

T.R. Sharma†

An attempt has been made in the paper to work out the districtwise trends in the production of all fruits and apples in Himachal Pradesh during 1970-71 to 1995-96 and to identify the factors responsible for the development of this sector in the state. The study is based on the secondary data collected from the Directorate of Horticulture, Government of Himachal Pradesh. The state has achieved a very impressive progress in the production of fruits during the study period. The area and production of all fruits increased at a compound growth rate of 6.28 per cent and 4.43 per cent per annum respectively during 1970-71 to 1995-96. The trends in the development of all fruits were impressive in Lahaul-Spiti and Kinnaur districts, besides Shimla and Kullu districts which are known as fruit bowls of the state. The increase in the growth rate of area and production of apples was 3.96 and 5.39 per cent respectively for the state as a whole during 1970-71 to 1995-96. Among the districts, the growth rate of area and production was comparatively high in Lahaul- Spiti and Kinnaur districts. At present, the productivity of apples is about 15 tonnes per hectare which is low as compared to the international standards. Three districts, viz., Kangra, Solan and Sirmaur registered a negative trend in the production of apples because in these districts the cultivation of off-season vegetables, potatoes and flowers are more profitable than apple cultivation. Secondly, apple is a temperate fruit while these districts fall in the low and mid-hill zones. The State Government has adopted a suitable policy to develop horticulture and its main components are the creation of road network in the entire state, creation of suitable organisations to supply various input services, technical know-how and post-harvest management in the form of facilities for grading, packing and marketing. The market intervention scheme is envisaged to ensure remunerative prices to the fruit growers so as to increase the producer's share in the consumer rupee which is around 46 per cent at present.

Horticulture as a Means of Tribal Development - A Case Study in Andhra Pradesh

N. Gopala Rao and A.G. Prasada Rao*

Horticulture has been developed in Andhra Pradesh as a means to improve the economic conditions of the small, marginal and medium farmers as the income generated from these crops is substantially higher than the traditional food crops. Besides, it earns considerable amount of foreign exchange by way of export of various horticultural products. However, these crops are confined mostly to the non-tribal areas in the state and the tribal areas are left out from the purview of horticultural development for quite a long time though there is

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vast scope and potential. Recently various horticultural crops are introduced in the predominantly tribal inhabited districts like Visakhapatnam and East Godavari under the International Fund for Agricultural Development (IFAD) progamme. An attempt is made in the paper to assess the impact of these programmes on the economy of the tribal households. From the point of view of the implementation of the programme, its initial coverage was successful. However, a deeper investigation reveals that there has been some shortfalls in the survival rate of the plants in the orchards. As a result, the expected generation of tree cover has not materialised. It has provided considerable employment during the planting year but subsequently, since the mortality rate was very high in one district, the beneficiaries became ineligible for the maintenance allowance prescribed under the programme and therefore in terms of income as well as employment they received a setback. Various measures to achieve greater success of the programme have been suggested, which include adequate supervision of the programme by concerned officials, laying down a large number of demonstration farms under the personal care of extension staff, careful selection of species to be raised in the context of local soil and climatic conditions and provision of irrigation sources

Constraints to Horticultural Development in Orissa

H.N. Atibudhi†

An attempt has been made in this study to focus on the status of horticultural development in the state of Orissa over time and identify the constraints in the development of horticulture in the state. The data on the area and production of different fruit and vegetable crops were used from secondary sources. Horticultural crops occupied 1.18 million hectares with a share of 19 per cent in the total cropped area in the state. The area under fruit orchards, vegetables and spices and condiments formed 4.19, 11.99 and 2.96 per cent of the total net sown area under horticulture respectively. The important fruits grown in the state include mango, coconut, banana, citrus and papaya accounting for 34.24, 20.37, 8.93, 7.89 and 5.80 per cent of the total area under horticulture respectively. The other fruit crops in the state are cashewnut, litchi, sapota, ber, jackfruit, custard apple, etc. The average growth rate was found to be positive for area and production of all the crops except potato which has registered a negative growth rate in area. The growth rate for yield was found to be negative for mango and citrus fruits. The constraints in the development of horticulture in the state are identified to be non-availability of planting material, lack of marketing support and price incentives in the producing areas, poor management, non-adoption of package of practices recommended and shortage of disease free planting materials. The study emphasises the need for replacement of very old fruit trees with new ones, adoption of improved cultivars from

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consumers' point of view, establishment of effective and efficient processing plants and cold storages, provision of marketing support and price incentives for horticultural crops, better management practices by supervision of extension personnel, making available quality planting materials, etc.

Resource Use Efficiency in Production of Selected Vegetables in Jabalpur Town

Manoj Kumar Singh and A.K. Sarawagi*

The objectives of the study are to determine the resource use efficiency of selected vegetable crops, namely, tomato, brinjal and okra (bhindi) vegetable crops in the locality of Jabalpur town in Madhya Pradesh and to identify the problems of production and marketing of these crops. The study is based on analysis of data collected from a sample of 45 vegetable growers from three villages in Jabalpur tehsil, pertaining to the agricultural year 1994-95. Cobb-Douglas production function was used to analyse the resource productivities in vegetable production. To work out the economic efficiency of the selected vegetable growers as users of resources, the marginal value productivity of input factors was compared with their respective acquisition costs. The results of the analysis revealed that vegetable cultivation was not undertaken as per the package of practices. These vegetable crops were grown as bonus crops without caring for resource productivity and the resource use efficiency. The entire concept of vegetable production needs change to make it a competitive enterprise. The major problems of production and marketing of vegetables faced by the respondent vegetable growers related to inadequate inputs supply, lack of storage facilities and approach roads and absence of co-operative marketing societies for the marketing of vegetable crops.

Assessment of the Fruit Cluster Scheme in the Development of Horticulture in Rajasthan

P.M. Sharma and K.A. Varghese†

The Fruit Cluster Scheme was launched in 1992-93 in Rajasthan with a view to promote cultivation of various fruit crops adaptible to different soil-water-climate combinations prevalent in different parts of the state. The scheme allows a subsidy of Rs. 800 per participating farmer to meet out the cost of plant materials, plant protection chemicals, plant nutrients and other petty expenses at the initial stages. It is obligatory on the part of the participating farmer to plant the same type of fruit crop in 0.4 ha area as per the packages developed by the Department of Horticulture, Government of Rajasthan. The scheme conceived under the World Bank-aided Agricultural Development Project (ADP) of

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Rajasthan has been introduced in 16 horticultural districts of the state.

The study attempts to assess the extent of performance of the fruit cluster scheme of the state, to identify the bottlenecks and to suggest strategies to enhance the prospects of this scheme in six districts during the period 1992-95. A sample of 60 participating farmers representing fruit cluster units of different fruit crops was selected from each of the six major horticulture districts, viz., Bharatpur, Jaipur, Jhalawar, Udaipur, Jodhpur and Ganganagar. The participating farmers of the programme were found to be resource endowed in terms of educational level, access to irrigation facilities and other farm resources required for orchard based activities. Nearly 86 per cent of the 360 sample orchard farmers were literate having access to one or the other sources of irrigation.

High mortality of plant materials has been identified as one of the most distressing factors. However, the mortality of these fruit crops which are emerging as most predominant in different regions was found to be within the tolerable limit. Concerted efforts on selected fruit crops adaptible to different soil-water-climate combinations may facilitate development of specific fruit belts which in turn would be favourable to develop production technologies, marketing network, processing centres, and other associated facilities required for promotion of specific fruit crops.

The poor gap filling practices being followed in all the six districts is mainly attributable to the present subsidy system which permits subsidy for plant material for initial planting only. In the absence of local nurseries growers largely depend on plant materials transported by the Department from distant places. The stringent condition to procure the number of plants for 0.4 ha by each participating farmer under the subsidy scheme prevents them to procure the required number of plants for gap filling in subsequent years. There is a great need to develop appropriate inter-cropping practices on scientific lines suitable to different fruit crops from planting year onwards so that the present inter-cropping practices with traditional crops of the area can be further improved for higher economic return without causing any adverse impact on orchard plants.

The existing marketing practices for fruit crops permit realisation of less than 50 per cent of the consumer prices by producer farmers. Institutional and policy intervention in marketing and pricing of fruit crops is a felt need by most of the fruit growers. The present production level and seasonality in the production of fruit crops do not encourage the establishment of processing centres for value addition to the produce locally. However, it may be possible to have integrated processing units for fruits, vegetables and other perishable agricultural commodities for different regions so that such units remain economically viable throughout the year. The development of local nurseries for supply of plant materials within reachable distances to the farmers is also important for the sustainable development of fruit crops in the state. In the areas of traditional fruit crops too, the reinvestment behaviour of the farmers is not conducive to the growth and development of the fruit crop sector. Since the participating farmers in the fruit cluster scheme are relatively resource endowed, any setback to the on-going scheme is likely to pose adverse impact on the prospects of fruit

production in the state. Hence, there is a great need to win the confidence of participant farmers so as to project fruit production as a promising option in the rural areas through the fruit cluster scheme.

Economics of High Value Crops' Production in Nainital District of Uttar Pradesh

Anil Kumar and R.S.L. Srivastava*

The study attempts to analyse the cost of production of four high value horticultural crops, viz., pointed gourd (*parwal*), hybrid tomato, garden pea and gladiolus based on primary data obtained through a census survey covering a sample of 68 farmers selected from three villages in two blocks of Nainital district of Uttar Pradesh. The data collected pertained to the agricultural year 1993-94. The profitability of the high value crops studied has been compared with that of common/conventional crops, viz., rice, wheat and sugarcane.

The results of the study indicated that the per hectare costs of production of all the four high value crops were substantially higher than the common crops like rice, wheat, maize and sugarcane. The per hectare returns and the net returns from the high value crops are also much higher than from common crops. The returns per rupee of investment on cost A_1 basis were also higher in three high value crops, namely, pointed gourd, tomato and garden pea, being Rs.1.52, Rs.1.46 and Rs.1.10, than those in common crops except sugarcane. In gladiolus, however, the net returns per rupee of investment were even lower (Rs.0.93) than those of the conventional crops.

The study concluded that since high value crops need substantial investments, these can be grown by rich farmers only, unless access to adequate credit is available to the weaker section of farmers. Besides, gladiolus is not a remunerative crop as it is believed to be. Hence, marketing arrangements are required to bring down the high marketing cost in this crop.

Present Status and Export Potential of Horticultural Products

V.P.S. Arora, Raka Saxena and Kanchan Tewari†

The paper makes an attempt to analyse and evaluate the present status and export potential of horticultural products in India. Changes in the area of major fruits and vegetables are analysed for 12 major states, pertaining to the period 1991-95. Time-series data on the export of horticultural products are computed from the data available with Agricultural and Processed Food Products Export Development Authority for two periods, 1984-85 to 1990-91 and 1991-92 to 1995-96. Exponential trend equations were also fitted to estimate the compound growth rates in the export of the horticultural products during the study period.

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The area under vegetables has increased tremendously in states like Tamil Nadu, West Bengal, Assam and Karnataka during the pre-economic reforms period whereas in fruit crops the increase in area has been very impressive only in Maharashtra. During post-economic reforms period the states like Gujarat and Madhya Pradesh for vegetables and Kerala, Karnataka and Assam for fruits have gained in importance. With increasing thrust on fruits and vegetables in most of the states, the production is getting more diversified across the country. The production of okra, peas, cabbage and tomato has increased by 111.44, 77.95, 40.96 and 23.99 per cent respectively during the post-economic reforms period. Papaya, banana and pineapple have registered growth of 70.49, 69.04 and 39.30 per cent respectively during the same period. The strategy, therefore, ought to concentrate on horticultural development in favoured agro-climatic regions.

The study noted that the area, production and productivity of horticultural products have increased, the export of major horticultural products, viz., floriculture, fruits and vegetable seeds and processed fruits and vegetables have shown tremendous increase during 1994-96. The exports of all horticultural products registered an impressive compound growth of 75.59 per cent per annum during the period. The major contribution to it came from fresh onion, dried and preserved vegetables, mango pulp, other processed fruits and vegetables, walnuts, pickles and chutneys and fresh grapes. The major export markets for Indian horticultural products are U.S.A., U.K., Saudi Arabia, U.A.E., Netherlands, Malaysia, Singapore, Germany, Pakistan and Bangladesh. Besides nurturing the existing markets, the markets where India has comparative advantage are also to be cultivated by using the aggressive marketing strategies. To maintain the tempo of increase in exports, special attention is required on quality control and market promotion activities. Looking at the export potential and long-term effects of exports on domestic availability, price realised by the farmers and price level at the domestic market will have to be considered. In order to increase efficiency of growers they should be provided with enough incentives in terms of remunerative prices and technological back-up.

Horticulture in Goa: Some Issues

Rekha R. Gaonkar*

The paper seeks to analyse the changes in area, production and productivity of the horticultural crops in Goa. It also examines other aspects such as marketing, constraints to growth and measures taken by the Government of Goa to boost up the production of horticultural crops in the state. The paper is based on primary and secondary data. Cashew is Goa's largest single crop and the only one with a net exportable surplus production. Next to cashew is coconut which has a great potential as a commercial crop. Other crops are

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mango, arecanut, banana, vegetables and flowers like chrysanthemums (xenvtim), crossandra (abolim), dahlia, jasmine and others. As far as vegetables are concerned, local production is less than one-fourth of local demand and hence vegetables are imported from the neighbouring states of Karnataka and Maharashtra.

The study revealed a considerable increase in the area of almost all crops during the period of 1960-61 to 1996-97 except in arecanut. Some crops such as arecanut, banana and pineapple are grown as inter-crop. Mango is grown in a scattered manner and very few orchards of mango with systematic cultivation practices exist in Goa. Another important finding of the study is the intra-state disparity regarding horticultural and plantation crops. The North Goa district dominated with 62 per cent of the total area under these crops, mainly due to more favourable agro-climatic conditions for growing horticultural crops and the progressive outlook of the growers and better infrastructure facilities in North Goa district.

South Goa has only 38 per cent of the area, mainly due to larger area under forests. Regarding cashew, North Goa dominated with 74 per cent of plantations, and South Goa accounting for the rest. As regards coconuts, South Goa dominated with 56 per cent of the area under this crop and the district has 68.8 per cent of the area under fruit crops with Salcete and Canacona talukas having more area under mango and other fruits. The production of almost all crops showed an increase with the exception of arecanut. The increase in production was more pronounced in cashew, coconut and vegetables during the period from 1960-61 to 1996-97. The study noted improvement in the yields per hectare of almost all crops during the period of 36 years.

Some of the constraints to the growth of horticulture in Goa are small size of holdings, lack of clear land titles, absentee landlord system, lack of proper market facilities, inadequate extension support, lack of sufficient irrigation, and acute shortage of labour.

Economics of Production and Marketing of Mango in Rampur District of Uttar Pradesh

A.K. Singhal and S.K. Agarwal†

In the paper an attempt is made to examine the cost and returns of selected mango orchards, the marketing pattern, marketing channels, marketing costs and returns involved in the mango fruits produced in the orchards and the problems and constraints in the production and marketing of mango in the study area and to suggest alternatives to increase the income from the orchards. The study is based on data collected from a sample of 46 major orchards (15 small, 18 medium and 13 large orchards) selected from two Nyaya Panchayats of Saidnagar block of Rampur district in Uttar Pradesh.

The average size of holdings of mango orchards was 5.65 hectares, of which an area of 3.69 hectares was under fruit bearing orchards and the remaining area was under non-fruit bearing orchards. The estimated per hectare cost for establishing new mango orchard was Rs. 2,610, Rs. 2,761 and Rs. 2,990 for small, medium and large orchards respectively.

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The average annual total cost (for the 15 year-period) (excluding inter-cropping) per hectare was Rs. 2,713, Rs. 3,102, Rs. 3,322 and Rs. 4,230 for small, medium, large and Horticultural Research Centre (HRC), Pantnagar orchards respectively, while the average annual total cost (with inter-cropping) was Rs. 3,039, Rs. 3,458, Rs. 3,719 and Rs. 5,040 for the corresponding size-groups of orchards.

The average annual total returns (excluding inter-cropping) per hectare were Rs.12,525, Rs. 14,226, Rs.16,071 and Rs. 22,948 for the small, medium, large and HRC, Pantnagar orchards respectively, while average annual returns (with inter-cropping) per hectare were Rs. 13,472, Rs. 15,239, Rs. 17,218 and Rs.24,890 for the corresponding categories of orchards. The average net returns over variable cost and total cost showed an increasing trend with the increase in the size of orchards and in the HRC Pantnagar orchards.

As regards the marketing of mango is concerned, about 87 per cent of the orchardists in the study area sold their fruits (mango) through the contractors. Following two marketing channels only were found in the study area: channel I: producer-contractor-commission agent/wholesaler-cum-commission agent/wholesaler-retailer-consumer and channel II: producer-wholesaler/commission agent-retailer-consumer. The share of producer/contractor in the consumer rupee was 37.44 per cent and 39.61 per cent in channel I and channel II respectively.

The study suggests that better management practices, i.e., application of recommended doses of fertilisers, chemicals and adequate irrigation facilities and timely operation of pruning, etc., can bring about a 50 per cent increase in the existing levels of incomes of the orchardists.