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RAPPORTEUR'S REPORT ON COMMERCIAL CROPS

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The subject 'Commercial Crops' was selected with a view to inviting papers that could cover a vast area, as enlisted in the synopsis. Though in terms of the number of papers received, the response was quite encouraging, however, the distribution of these papers under various themes has been quite uneven. In all, 38 papers have been accepted for discussion at the Conference under this subject. To facilitate systematic representation, these papers are classified into five groups and reviewed and the last section lists the important issues emerging from the review that might be considered for discussion at the Conference.

I

CHANGES IN CROP COMPOSITION, GROWTH AND INSTABILITY OF COMMERCIAL CROPS

The contribution on this theme was the largest in number. In most of the papers in this group, an attempt has been made to measure the growth rates in area, production and productivity of commercial crops. These growth rates are estimated mostly with the help of semi-log equation. Though quite a large number of crops have been covered, maximum coverage is devoted to sugarcane, rapeseed and mustard, groundnut, cotton, potato, tobacco and jute. While measuring growth rates, quite a large number of papers have placed emphasis on examining the instability in production, area and yield of these crops, some of the authors have endeavoured to examine the sources of instability in production as well. In addition, the relative contribution of different components to output changes over time either in physical or value terms has also been examined by a few authors. The above-mentioned various aspects have been examined at district/region/State or national levels over one or more than one series of time. Quite a few authors have analysed the time-series data covering the pre-green and post-green revolution periods separately.

N. L. Agarwal has examined the changes in the composition of commercial crops and estimated the growth rates in area, production and productivity of oilseeds in Rajasthan for the period 1956-57 to 1983-84 and 1966-67 to 1983-84 separately. The composition of area under commercial crops is examined for the different agro-climatic zones of Rajasthan. The author has observed that the relative share of commercial crops has increased over time. The area under oilseeds notably groundnut and rapeseed and mustard increased significantly during the period 1956-57 to 1983-84, which

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the author attributes to favourable price policy and higher profitability, though the profitability aspect is not examined empirically.

Suresh Pal and A. S. Sirohi while studying the sources of growth and instability in the production of commercial crops in India have observed that the growth and stability are complementary in irrigated crops specially in sugarcane and potato. In groundnut, cotton and jute though the rate of growth in production has been of a lower order in 1967-68 to 1984-85 compared to 1949-50 to 1964-65, the magnitude of instability has been higher in the technological era. The statistical significance of growth rate, however, is not mentioned. In view of the change in area variance being mainly responsible for increase in production instability in sugarcane, jute and potato and that in yield variance for groundnut and cotton, area stabilising policies for sugarcane, jute and potato, and yield stabilising policies for groundnut and cotton are advocated for the achievement of production stability.

K. K. Jain *et al.* also have examined growth and instability in commercial crops in Punjab. In addition to estimation of districtwise growth rates in area and yield of oilseed, cotton and sugarcane for the pre-green revolution and post-green revolution periods, they have measured instability and decomposed the changes in production variability using detrended production data as product of detrended area and yield. Sugarcane and total oilseed registered negative growth in area in the post-green revolution period as against positive growth in the pre-green revolution period. Yield growth rate has been more impressive in the pre-green revolution period for oilseed and cotton, and in the post-green revolution period for sugarcane. Yield and area variances are the major sources of production instability in sugarcane.

J. S. Sidhu and R. S. Sidhu while apprehending the emergence of serious ecological and production oriented market problems owing to over-dependence of Punjab on paddy-wheat rotation, have examined the changes in the composition and growth rates of commercial crops. They have observed that the share of commercial crops which included cotton, oilseed, sugarcane and potato, in the gross cropped area of the State decreased substantially in 1984-85 as compared to that in 1965-66. Also, the growth rate in area for other commercial crops has been negative, except for American cotton and potato. Production growth has also been negative for groundnut and cotton.

O. P. Sambhar and P. Mehta have estimated the growth rates and variability in ginger and potato during 1966-67 to 1971-72 and 1972-73 to 1980-81 for different districts of Himachal Pradesh. They noticed that Sirmaur and Shimla accounting for a major share of acreage under ginger and potato respectively, registered a higher growth rate in production during the second period with a slightly lower magnitude of variability. Growth rates and variability aspects were also examined by P. R. Waghmare and K. V. Deshmukh for sugarcane in Marathwada, by N. Subba Rao for tobacco in different States as well as for India as a whole, by Chhotan Singh and V. C. Mathur for potato in India and by Kandarpa Kr. Barman for commer-

cial crops in Assam. Subba Rao has observed fluctuations in area, production and productivity of tobacco during different periods with a pronounced order of production instability. The author's observation that instability in production is attributable to fluctuation in area and yield, however, needs empirical verification.

A valuable paper is that of Jawahar Thakur *et al.*, who have examined the changes in area, production and yield along with their variabilities and estimated the growth rates for the period 1960-61 to 1970-71 and 1971-72 to 1984-85 for oilseeds in Bihar. They have also examined the technological change for these crops using production function model with dummy variable. The authors have observed that both production and productivity of rapeseed and mustard and linseed increased substantially in the post-green revolution period as compared to those in the pre-green revolution period. The variabilities in production and productivity of these two crops have also decreased in the post-green revolution period. The area under these crops registered negative growth in both the periods with the only exception in the case of linseed in the second period. Over time, technological change has been observed to be of no significance to have any impact on the production of rapeseed and mustard and linseed.

S. Mahendra Dev has estimated compound growth rates for area, production and productivity for 276 districts during 1962-65 triennium to 1975-78 triennium. Both unadjusted and weather adjusted growth rates in oilseeds production are estimated. The estimates show that in more than 100 districts total production recorded negative growth. The degree of instability in oilseed production was generally high in a majority of the States. There has been significant locational shift in the share of oilseeds area and output from the northern region to the eastern region.

Growth rates in area, production and productivity along with variability are examined by H. R. Sharma for sugarcane, oilseeds, tobacco, potato and jute and by Jagdish Lal for sugarcane. In the former study it was observed that the contribution of yield towards increased production was more (except in sugarcane) in the period 1966-67 to 1984-85 and that of area was more in the period 1949-50 to 1965-66. In the case of the second study, it was observed that the contribution of area in increasing production of sugarcane during 1950-51 to 1986-87 was more than that of productivity. These inferences however could have been verified through decomposition analysis which the authors have failed to do. Similarly, Sharma has projected the level of production on the basis of growth rate only. One can only wish that he had resorted to more refinement by examining the other relevant aspects having a bearing on production and included the same in the model to be used for projection.

Three papers have dealt with, in addition to growth rates, the relative contribution of different components to the production of commercial crops through decomposition analysis. Swarn Lata Arya and B. S. Rawat have estimated the growth rates for oilseed, sugarcane, potato and cotton for the

year 1966-67 to 1980-81 in Haryana, K. N. Rai *et al.* for edible oilseeds in the different States as well as for the country as a whole, and Salik Ram *et al.* for the major commercial crops of Orissa respectively. In the first paper, the contribution of area, yield and price to total value production is measured while in the other two papers, the decomposition is that of physical production. The decomposition analysis indicated that for the commercial crops in Haryana, a decrease in the contribution of area was associated with an increase in the percentage share of the price component while for the commercial crops of Orissa and edible oil in India, change in output was greatly influenced by area effect as compared to yield effect.

II

ECONOMICS OF COMMERCIAL CROPS

The response of authors to contribute on this theme was also quite encouraging. In most of the cases, the authors have worked out the economics of commercial crops either individually or with a number of commercial crops and in a few cases have depicted a comparative picture with competing non-commercial crops. In addition, in a few cases, the authors have also endeavoured to examine the resource use efficiency in commercial crops. Some of the authors have also attempted to assess the employment potential through commercial crops. In one case, economic yield gap has also been estimated.

C. Latha Bastine and V. Radhakrishnan, using cross-sectional data from a block of Trichur district, have worked out the costs and gross returns from banana cultivation which were as high as Rs. 26,248 and Rs. 45,068 per hectare respectively. The cost of cultivation decreased with the increase in farm size but net income at cost C decreased only on farms upto 1.2 hectares. Since the sampling design lacks clarity with respect to proportional representation of holdings, the average picture leaves a question mark about its generalisation. Also there is arbitrariness in assigning one-fifth of gross return as rental value.

A. Nageswara Rao *et al.*, using time-series data from a few selected farmers maintaining records in selected villages of Guntur district of Andhra Pradesh, have estimated costs and returns of cotton. Triennial average of three years, 1969-72 was taken as the base for computing indices of costs and returns and the total period from 1972-73 to 1985-86 was divided into three periods for examining the changes in costs and returns of cotton. The authors have observed that the production of cotton was more profitable in the early stages of cultivation mainly because of high-yielding and hybrid varieties of cotton, adequate fertiliser application and relatively low pest incidence. Subsequently, high profit motivation led to high doses of fertiliser use and indiscriminate use of pesticides which contributed to high production cost instead of increasing yield and profit. These observations of the authors however are based on non-specified number of case studies and hence have limited scope for generalisation.

In two of the papers, the authors have examined the comparative economics of commercial crops with its non-commercial competing crops. Rajendra Singh and S. M. A. Rizvi, using data from 100 soybean growers of two soybean growing districts, *viz.*, Nainital and Jalaun, have estimated the cost of production and net return for soybean and its competing crops like paddy, maize, jowar, etc. Soybean is found to be the most profitable crop in the *kharif* season in both the regions. N. A. Gadre and Y. P. Mahalle in their study, using cross-sectional data from 100 cultivators growing rainfed cotton, 100 cultivators growing *mung*, followed by *rabi* crops and 50 cultivators growing *tur* as soler ainfed crop in Akola district of Maharashtra, have worked out costs and returns and input-output ratio for cotton and its competing non-commercial crops. *Tur* gave the highest net return per hectare (Rs. 2,905), followed by *mung*-safflower (Rs. 2,627), *mung*-gram (Rs. 1,805), hybrid cotton (Rs. 1,062) and *mung*-wheat (Rs. 948), indicating thereby the superiority of substitute crops over hybrid cotton.

There are two papers which focused, in addition to profitability, on the resource use efficiency in commercial crops. L. S. Gangwar and S. P. R. Chaurasia using cross-sectional data from Tarai for the year 1985-86, have examined costs and returns of lahi crop on various sizes of farms. The authors have estimated the marginal value productivities of farm resources and compared the same with their acquisition costs to infer about resource use efficiency. They have observed that the net return per hectare was the highest on the medium farms (Rs. 2,212), followed by the large (Rs. 1,911) and the lowest on the small farms (Rs. 214). Larger size farms through adequate emphasis on plant protection measures have realised better yield. Also there existed inefficiency in resource use on different sizes of farms and the resource use pattern was sub-optimal. In another paper M. L. Chakraverty *et al.* have examined the relative profitability of jute varieties on different sizes of farms along with resource use efficiency in jute in Cuttack district. The study indicated that variety C. olitorius required more capital than C. capsularis and the net return per hectare ranged from Rs. 952 on the large farm to Rs. 2,437 on the medium farm in the case of C. olitorius and from Rs. 486 to Rs. 1,711 in the corresponding size-groups in the case of C. capsularis. There existed sub-optimal use of farm resources in jute crop. While using regression analysis to assess the resource use efficiency, the authors have, however, failed to examine the presence of multicollinearity, and the reliability of the results is therefore questionable.

Ranveer Singh and J. P. Bhati have examined the role of vegetables in augmenting farm income and employment in Himachal Pradesh, a State with a vast potential for the production of off-season vegetables and vegetable seeds. Examining the area under vegetables, average yield and yield gap between experimental field and farmer's field, the authors have arrived at the conclusion that for some of the vegetables like pea, cabbage, cauliflower, tomato and potato, there is vast scope to increase productivity through proper use of available technology. In view of land being the most scarce resource

in the hills, the authors have compared the returns for different crops in terms of net return per hectare per day and observed that vegetable farming is more probitable than the cereal crops. Also the per hectare labour requirement is much higher for vegetables than for the cereal crops. Thus vegetables provide an opportunity for gainful employment to the family members on small size farms. In another study, R. R. Waghmare and N. N. Pathak have compared the costs, returns and employment potential of commercial crops in Sholapur district of Maharashtra, using cross-sectional data from unirrigated and irrigated conditions. The economics of crop production under unirrigated condition reveals that farms with no commercial crops secured higher income (Rs. 613/ha.) than those with commercial crops mainly because of low productivity of commercial crops. Under irrigated condition, farms with commercial crops secured higher net return (Rs. 2,815/ha.) as against those with no commercial crops. Furthermore, commercialisation of both irrigated and unirrigated farms augmented the employment of human labour.

An interesting study is that of V. K. Pandey and S. K. Tewari who estimated the cost function for sugarcane production in western U.P. The estimated cost function was used to present long run cost function through addition of the concept of normal profit. The authors have adopted a new approach to conceptualise normal profit using the parameter delineating poverty levels. They used Rs. 6,400 as the level of normal profit which is required to sustain a small farmer in farming business. The estimated total variable cost (TVC) along with the fixed cost, as estimated separately through arithmetic mean of the sample weighted by operational size of holding, was used to determine the total cost (TC) for different levels of output. This in turn was used to derive the profit function to be equal to normal profit. Subsequently, long run support price was determined. Through grouping of the farmers into 'best', 'progressive' and 'backward' based upon distinct yield ranges, economic yield gaps for different groups of farms were determined. The study indicated that only the 'best farms' were fairly close to the most efficient level of 925 quintals per hectare (with an economic yield gap of only 54 quintals). The authors suggest greater reliance on production policies in combination with long run support price policy to bridge the economic yield gap. Though the paper has its own merit from the viewpoint of methodological contribution, the rationale of keeping Rs. 6,400 as normal profit is not clear. Also the assumption of single crop economy for one hectare farm does not seem to be reasonable.

III

SUPPLY, DEMAND, PROCESSING AND MARKETING

The theme encompassing supply and demand determinants and projection, processing and marketing aspects of commercial crops evinced a good deal of interest on the part of contributors.

Acreage response of commercial crops is studied by Sidhu and Sidhu through the use of Nerlovian lagged adjustment model. Thev have observed that the development of new technology in cereals was responsible for the replacement of area from groundnut in Punjab. In all other traditional commercial crops, relative price and price stability were the important factors that had a bearing on their acreage, and thus a long run price policy backed up by efficient procurement system was considered desirable for stable production. In view of the relative economic disadvantage, more effort is required for the improvement of production technology of commercial crops.

V. T. Raju *et al.* have estimated the area response of commercial crops for selected districts falling under different agro-climatic zones of Andhra Pradesh. They have observed that lagged price played an important role in the allocation of acreage in cotton, tobacco and groundnut. Price risk aversion was conspicuous among cotton and chilly growers. S. K. Lal *et al.* have analysed the area response behaviour of rapeseed and mustard growers using a modified version of the Nerlovian adjustment model. The authors have noted that lagged area of rapeseed and mustard, and lagged yield of wheat as well as rapeseed and mustard were the key factors influencing supply behaviour of rapeseed and mustard growers in Uttar Pradesh. Short run and long run price elasticities were found to be 0.4325 and 1.2502 though they were based on non-significant coefficients. In another study, K. Subbarama Raju and P. B. Parthasarathy have estimated the supply response of major oilseed crops over time and space in Andhra Pradesh. They have developed growth induced supply response model (Nerlovian adjustment) using dummy variable technique. The results revealed a differential rate of response over crops and regions.

Input demand and output supply response functions were estimated by G. Subramaniyan and V. Nirmala for cotton farmers in Tamil Nadu, using normalised Cobb-Douglas profit function. By and large, cotton farmers in Tamil Nadu are price responsive. The demand for variable inputs is sensitive to changes in cotton price. The demand for labour is more sensitive to changes in cotton price than to changes in real wages. In view of the responsiveness of sugarcane supply to its own price and factor price being inelastic, the authors feel that a higher sugarcane price and/or input subsidies may not be an effective instrument for stimulating the supply of cane. The output supply and fertiliser demand for groundnut and cotton are sensitive to factor prices, reflecting the scope for price manipulations for increasing the supply of these crops.

D. S. Nandal *et al.* have attempted to project the demand for and supply of rapeseed and mustard oil in Haryana upto 2000. Urban and rural population and income were projected and expenditure elasticities were worked out to project the total demand. With the help of historical growth rates in the production of the crop in the past, the authors have projected the output and converted the same into oil supply. The projected supply when compared with the projected demand indicates surplus production of rapeseed and

mustard in Haryana over the years. The supply projection, however, is based on crude methodology, which disregards other relevant parameters.

The processing aspect was covered in two papers. M. P. Azad *et al.* while examining the disposal pattern of sugarcane on different sizes of farms in Meerut district, have analysed the economics of processing of sugarcane products. They have observed that the processing cost per quintal worked out to Rs. 26, Rs. 91 and Rs. 145 for gur, khandsari sugar and crystal sugar respectively. In another article, V. P. S. Arora *et al.* have examined the functioning of soybean processing plant and estimated processing, selling and distribution cost of soya products in Uttar Pradesh. Using the transportation model, they have also devised appropriate soybean purchase plan. They have observed that the co-operative sector plant is the most inefficient with a processing cost of Rs. 90 per quintal as against the private sector plant with Rs. 54 only. The processing cost could be reduced through an increase in the use of available installed capacity and optimum use of inputs. They have also pointed out the scope for reducing the existing transport cost incurred by soybean processors with the implementation of optimum purchase plan.

M. M. Kalloli *et al.* have examined the effect of quality characteristics of groundnut on their grades, as also the impact of grades on prices in some regulated markets of Karnataka. In order to determine the combined impact of the qualitative and quantitative factors on groundnut price, they have used both independent and dependent variables in terms of mean deviation of log value of the variables. Based on the empirical findings, the authors have concluded that the grade values and prices are closely related and thus there is need to have a well developed scientific grading system in the regulated markets.

Rajagopal has made an attempt to examine the structural relationship subsisting between various components of price spread, their impact on the producer's share and the substitution effect on cropping pattern due to price spread with respect to cotton and tobacco crops in Guntur district of Andhra Pradesh. The data are analysed through linear equation and sensitivity test. The study indicates a shift in the cropping pattern from tobacco to cotton. The price of tobacco evinces greater sensitivity to the cost of marketing. The producer's share in the consumer rupee is higher in cotton crop.

IV

EXPORT PERFORMANCE

S. Bandyopadhyay has observed that production and export of both cotton and tobacco in physical terms are noticeably fluctuating during 1974-75 to 1985-86. The compound growth rate of export quantity of tobacco and cotton was estimated at 2.40 and 7 per cent per annum as against 2.05 and 1.69 per cent growth in production respectively. The total value of export and export price per tonne registered a growth rate of 6.30 and 3.80

per cent per annum respectively in the case of tobacco and 16.90 and 9.44 per cent in the case of cotton. In view of the volume of production and export price exercising no significant impact on the quantity of export of these two crops, it is pointed out that some other complex factors like quality of product, cost of production, productivity, domestic consumption, export duties and competition in the international market are responsible for the growth in export of these products. The authors thus consider the need for quantitative and qualitative improvements of the products to augment export trade in the long run.

Shiv Ram Dass *et al.*, using the data for the year 1961-62 to 1983-84, have evaluated the performance of export of raw cotton, tobacco, oilcake and sugar. They have estimated the annual compound rate of growth in the quantity of export at 4.12, 2.80, 0.79 and 0.20 per cent for tobacco, sugar, oilcake and raw cotton respectively as against 5.20 per cent for general export, indicating a decline in the share of these crops in the total export. Export price registered a growth rate of 8.75, 8.38, 8.36 and 8.15 per cent for raw cotton, oilcake, tobacco and sugar respectively. The export elasticities of production of these crops are positive while those of national income are negative for sugarcane, raw cotton and oilseed. Thus in order to neutralise the adverse impact of increasing national income on the exportable surplus of commercial crops, higher growth rate of production of these commodities is called for. Relative export price had negative elasticities for raw cotton, tobacco and oilcake because of flexible excise duties on the export of these commodities. Thus there exists great scope for improvement in the export performance of these commodities through augmentation of domestic production.

V

CONSTRAINTS IN PRODUCTION OF COMMERCIAL CROPS

P. M. Sharma and Raj Kumar have conducted an opinion survey of 144 mustard growing holdings comprising small, medium and large farms in Bharatpur district of Rajasthan and have attempted to identify the constraints in mustard production. Lack of effective control measures of diseases and frost was considered as the major constraints by 93 per cent of the irrigated and 84 per cent of the unirrigated farmers. The second important constraint was the non-availability of inputs at proper time specially of new HYV seeds, fertiliser and fungicides. Production uncertainty was the third constraint for the unirrigated farmers while the irrigated farmers gave this factor the fourth place next to lack of knowledge about recommended package of practices. Thus the unirrigated farmers are relatively more prone to production risk.

M. R. Alshi, *et al.* have examined the constraints in the adoption of improved technology for cotton crops in the Vidharbha region of Maharashtra. Out of the 130 respondents, 79 farmers did not apply fertiliser at recommended

levels, 34 per cent of them considered that fertiliser was not economically profitable while another 30 per cent felt that the doses of recommended level of fertiliser were too much. About 29 per cent of them could not get loan in adequate quantity to apply fertiliser. Ninety-five farmers did not adopt recommended plant protection practices. Of these, 43 per cent lacked fund to purchase pesticide while 35 per cent of them did not face any incidence of pest. Another 27 per cent faced a problem in the procurement of spraying machine.

VI

ISSUES FOR DISCUSSION

Some of the major issues that emerge from the survey of the contributed papers for discussion are given below:

1. Concept of Commercial Crops

The papers received covered oilseeds, sugarcane, cotton, jute, tobacco, vegetables, spices as well as some such crops like betelvine, banana, cashewnut, etc. It is desirable to have clear conceptualisation regarding commercial crops.

2. Scope for Regional Specialisation

Is it desirable to resort to regional specialisation based on the potential of commercial crops? If so, then what parameters should be kept in mind while assessing their potential? Would these parameters be inclusive of base period yield, its growth rate and stability and comparative economic advantage of these crops, particularly during post-green revolution period? What degree of regional specialisation should be pursued and what would be its consequences, notably from the viewpoint of inter-farm and inter-regional inequality in income distribution?

3. Changes in production of some of the commercial crops such as edible oils is greatly influenced by area effect compared to yield effect. In view of the scarcity of cultivated land and the pressing need for augmenting production, what policy measures are required to enhance the yield effect?

4. Policies for Reducing Production Instability

It has been observed that for such irrigated crops like sugarcane and vegetables, higher growth rates in production are also associated with relatively lower magnitude of instability while in rainfed crops like groundnut, cotton and rapeseed and mustard and jute, even in the post-green revolution period, the magnitude of instability is of a higher order. The instability in production is attributable primarily to area instability in the case of the former and yield instability in the case of the latter. What policy measures would be required to reduce the area and yield instability in irrigated and rainfed conditions respectively?

5. Commercial crops are associated with higher production and price risk than the food crops. What appropriate measures are required to reduce the risk and augment the risk bearing ability of the farmers?

6. In view of the discriminating practices followed by the traders against the small farmers, what policy measures should be adopted to eliminate the discrimination against the small farmers?

7. Excepting a few commercial crops like tobacco, for most of the major commercial crops, internal demand is increasing at a faster rate resulting in a reduction in exportable surplus. This problem is further accentuated by lack of competitive position in the world market mainly because of poor quality products. What measures would be desirable to enhance the exportable surplus as well as competitiveness of our products in the world market?

8. During the green revolution era as a result of our research efforts, a brighter picture has emerged with respect to the yield potential of not only the cereal crops but also of commercial crops. However, the yield gap in the case of commercial crops is quite large. What are the constraints holding back the productivity of commercial crops at low level? How to quantify these constraints and their impact on yield? What measures should be taken to eliminate these constraints?