CHAPTER - 3.

• REVIEW OF LITERATURE •
3.1 Every research problem encompasses a number of aspects to be considered and has many alternative solutions under a given set of conditions in the problems solving process. The problem of similar nature when confronted by many individuals under different situations and in different forms is met with a number of independent ways.

In this review the approach has been to trace the representative studies on the subject in chronological order. No detailed critical examination of these models is attempted. The objective is to examine the procedure adopted by the earlier investigators which would help in our attempt to specify and develop an alternative path.

3.2 Panse, V.G.\(^1\)(54) observed in his study that an expansion of area under a crop has been seen to be a factor associated with the lowering of yield rate while an increase in the proportion of irrigated area has the opposite effect.

George, M.Y; Nampoori, T.N.M.\(^2\)(66) investigate that there are wide disparities in the yield and output of agriculture between different regions within the country. The fact that such disparities exist even within a region is significant. The authors have also observed that there is a high degree of variation in yield per acre in different districts and among the food crops. Rice has recorded the highest variation.

Shetty, S.A.\(^3\)(70) study reveals that acreage expansion was the most important source of growth of production at the all India level. The contribution of area and cropping pattern accounting Ninety percent of the increase in productivity.
Desai, G.M.\(^4\) (71) has made some observations on the efforts to increase rice production in India through the introduction of the new technology. The study concludes that there is an urgent need to develop HYVarieties suitable for cultivation in different parts of India in the kharif season because of vastly greater importance than rabi in the total rice acreage.

Parthsarthi; R, Prasad, D.S.\(^5\) (71) in a study pointed out that the pace of progress of HYV rice programme in kharif season is low because of low profitability. The reasons given are lower product prices in kharif compared to rabi and the product response of fertilizer is known to be lower in kharif than in rabi. Lastly the authors state that, if the recommended dose during the kharif is prescribed it might adversely affect the percent yield rate.

Sarkar, H; Heady, Earl-D\(^6\) (79) estimate the production and fertilizer response of rice from national data for a number of developing countries. In this context the land area is into areas pertaining to high yielding varieties and traditional varieties respectively. The authors have generated coefficients indicating the substitutability of fertilizer and land use for both HYV and traditional varieties of rice. The extend of the substitutability has been compared for three Asian countries viz. India, Burmah and Indonesia.

Aiyasamy, P.K; Subramanian; V.\(^7\) (79) estimated the compound growth rates in area, production and productivity of rice in different districts of Tamilnadu. It is pointed out that the production of rice crop in Tamilnadu has been almost stagnant in the pre-green revolution period and marginal increase of 1.2
percent in the production is contributed by extension of area under rice. During the green revolution period the significant increase in production occurred consequent to increase in productivity levels with the area under rice almost constant.

Alagh, Yoginder K. 9(80) examined the regional disparities in Indian agriculture and revealed marked differences in the level of agricultural development at regional level in the Indian economy. Growth pattern of sixties and early seventies also showed marked area specifically. The low level of agricultural development in the large part of the economy and the slow agricultural progress is a matter of concern. The analysis showed that while public policies do play a role, private initiative and also institutional and social conditions determining the acceptance or rejection of newer agricultural practices.

Rath, Nilkanth. 9(80) examined the performance of agricultural production in India by using summery measures. The purpose of the study is to raise questions relating to the underlying factors responsible for such performance. The summary measures have been obtained by fitting exponential trend functions to the index no. of production and yield rates of the major crops grown in India for the period 1950-51 to 1971-71. To avoid wide and irregular fluctuations the author has used a priori judgment to omit particular observations from the time series data before fitting a trend line.

Alagh, Yoginder K.; Sharma, P.S. 10(80) felt that the green revolution started having an appreciable effect on Indian economy only since 1969-70 and it may be useful to develop sub periods keeping the indicators of the spread of the green revolution in view. The authors applied "t" test to examine
if the growth rates of selected crops in the major states in the two periods are significantly different from each other. They observed that the estimated growth rates in period II are generally higher than those for period I. Growth is more evenly spread in period II as compared to period I. Authors stated that, if the conclusion is accepted that agricultural growth in the period II (1969-70 to 1978-79) is higher than in the period I (1960-61 to 1969-70) then the agricultural sector as a constraint to the planning of a higher growth rate of the Indian economy is now less of a problem.

Rao,A.V;Mahajan,R.K. and Sarma,Y.R.B.\textsuperscript{11}(81) studied the growth rates of area, production and yield of rice crop in India and determined the effect of area and productivity and their interaction on the increase in rice production. They concluded that at the country level the growth rates for production and productivity were of the same order during the pre-HYV and HYV period inspite of the decline in the growth rates of area. This indicates the development of rice crop technology in terms of biological components (HYV) and associated factor, such as use of optimum fertilizer doses and effective management practices.

Singh, H; Bokil, S.D;Singh,D.\textsuperscript{12}(81) observed that the green revolution in India is mainly a wheat revolution and that does not affect food grains production significantly (particularly rice). It is true that there has been no spectacular increase in rice production comparable to wheat, however rice production has certainly been going up steadily. They observed if the rate of fertilizers application to rice goes up at the expected rate of growth of fertilizers consumption for all crops the target of production set for the next plan was likely to be exceeded assuming that normal weather condition would prevail.
Shanti, Sarup, & Pandey, R.K. (1982) analysed the factors affecting rice production in Madhya Pradesh by using "Mahalanobis - $D^2$ Statistics" by dividing 45 districts in two groups on the basis of rice productivity. They further examined the effects of the important discriminating factors on the yield rate of rice. The regression equation has been estimated for the purpose where the regressors are percentage area under HYV seeds, total nutrients application and average operational holdings. They found that productivity depends mainly on irrigation, fertilizers use and use of HYV seeds and suggested that any strategy to increase crop productivity would have to include for substantial increasing use of inputs like improved technology of cultivation and plant protection measures. Improved marketing facilities will also induced the farmers to raise their farm yield.

Pandit, Somnath (1982) studies broad trends in area, production and yield of the principal crops in U.P. The investigator revealed that the acreage response in case of rice and sugarcane with reference to price was positive but in case of wheat the effect of shifter variable like yield was more important then the price level. The author suggest that there are two important policy decisions to be taken with respect to farm production in the state:-

(I) the emphasis is to be laid on vertical expansion of land and
(II) there is a need for developing a farm technology which keeps the farms permanently under crop.

Shafi, Mohd (1984) has examined the concept of agricultural productivity and used stock of various approaches towards the measurement of agricultural productivity. The relationship between productivity and various inputs factors revealed
a most significant result among four variables namely irrigation by canal, irrigation by other sources, N.P.K. Consumption and agricultural labours in the low productivity regions. The analysis reveals that the first three variables have a positive regression coefficients increasing food production, while the last variable has a negative coefficient which shows a decrease in the number of workers would bring about a significant increase in agricultural productivity. He suggests that if productivity improves it would be possible to generate more diversified opportunities for the employment of more workers in the post harvest period of agricultural production.

Parthsarathy, G.16(84) examined inter district variation in growth rates of agricultural production in Andhra Pradesh and found variations in growth rates between pre and post green revolution periods. The degree of instability in agricultural production is high in all the districts. The post green revolution period shows a higher degree of instability. The author has made a suggestion in his study that districts which have achieved higher growth rates are also subject to greater instability.

Desai, D.K.17(84) has made an attempt to analyse the data of rice production in Eastern India as a whole and by state for the period 1971-72 to 1981-82 and to investigate the reasons for low productivity and reveals that the slow rate of adoption of HYV seeds indicates that perhaps a proper rice technology or technologies have not yet been evolved for various parts of Eastern India. Even at the low rate of the productivity, some districts have shown moderate growth rates whereas a large number of districts have shown negative growth rates of productivity. He suggests that a research project be under taken making a comparative study of the two groups of the districts, one with the
moderate growth rates and two with the negative growth rates to identify the factors governing low productivity and then suggest measures to improve productivity.

Pandey, R.K; Sarin, B.S.\textsuperscript{18} (84) examined the acreage response of farmers for rice crop in different regions of U.P. and for the state as a whole. The author collected time series data. The results showed that dependent and independent variables have different effects for each region. Eastern and Bundelkhand regions have possibilities to increase average of rice crop through irrigation. The impact of technological changes reflected through increase in yield of the crop is more on this crop. The study showed that an improvement in the yield can increase the area under rice.

Kannan, R\textsuperscript{19}(84) observed that there was evidence in deceleration in the rate of growth of foodgrain production during 1950-51 to 1964-65. However no deceleration in the growth rate has been witnessed since 1967-68. In the case of non-foodgrain the average growth rate of area and production were significantly lower in the period 1967-68 to 1982-83 as compared to the period 1950-51 to 1964-65. Considering the decade beginning 1970-71 , structural changes resulting in acceleration in the growth rates appeared in 1974-75 , which is attributable to both the growth rates of rice and wheat. Among the foodgrains only wheat showed a considerable increase in growth rates in the post green revolution period.

R.B.I.'S Report\textsuperscript{20}(84) The growth in agricultural productivity particularly in the last two and half decades has been modest and well below the attainment levels considering Eastern India large potential. In view of this R.B.I. jointly with
National Bank for Agricultural and Rural Development (NBARD) appointed a committee. The committee submitted its report on December 31, 1984. The committee made a detailed study of the constraints on improving agricultural productivity in this region and suggested remedial measures with particular reference to credit and investment to achieve as much of the potential as possible by the end of the present decade. The report has pointed out that accelerated agricultural development in the region has to be spearheaded by massive provision of tube-wells and pumpsets, improvement in drainage, water management techniques, research as extension power, custom services and post harvest managements for storage and marketing. It has been urged that promotion of cultivation of HYV crops and high value crops through the adoption of labour cum capital intensive techniques by small and large farmers is necessary.

Kainth, G.S; Mehta, P.L. (1985) This study is a diagnostic exploration of the various constraints in the production and marketing of rice in one of the productivity backward region of North Western India. The authors examined the growth and regional disparities in rice production, productivity response to agronomic management and the sources of regional variations in paddy production. The study revealed wide inter-regional disparities in rice productivity which is mainly attributed to the skewness in the level and pattern of resources use. The study focused attention towards public investments infrastructural facilities and agricultural inputs in a relatively backward region to reduce regional imbalances. There was a great scope for improving production via productivity as many of the basic ingredients necessary for accelerated agricultural development were available. Future strategy for increase in rice production should be the spread of improved rice technology in all important rice growing states of
the country.

Haque,T.22(85) estimated district wise trends and variability in the yield of rice and determined the inter-district variations and identify various technological, economical and agro-climatic constraints to high yields of rice in West Bengal. The author used both secondary and primary data for these purposes. He concluded that inter-district and inter-farm variations in the yield of rice as well as the large gap between the actual and potential yield of rice, present a mixed out look of both optimism and pessimism. While it was reasonable to hope that any uniformly high spread of the new technology of production in over all the districts would sufficiently raise the yield of rice in the state. The author concluded that the inverse relationship between the proportion of leased in area and yield of rice suggested that the abolition of tenancy including share cropping would be helpful in raising the productivity of rice in West Bengal.

Gangwar,A.C;Rai,K.N;Sbrinivasan 23(85) examined the growth rates and trends in area production and productivity of rice in important districts of Harayana. The trends analysis showed that the area production and yield increased in all the districts and also for the state as a whole. The high growth rates may be attributed to the availability of good quality seeds of HYVs, expansion of irrigation facility, increase in water logging areas and the relative profitability of the crop.

Venkatraman,A24(85) studied the performance of rice production in Tamilnadu and revealed that initial spurt of increase in production was due to the expansion in irrigation and next spell of increase during the late sixties and early seventies was generated
by the HYV seeds. This overall increasing trend is punctuated by sharp fluctuations in output. The author further noted that though rice production has reached the plateau in Tamilnadu evolving suitable strains of paddy for the main samba season, modernizing the tanks and judicious exploitation of ground water resources along with increased fertilizer supply and plant protection services would take the state to a higher level of rice production.

George, P. S.; Mukherji, C. (86) analysed the changes in the growth pattern of rice in Kerala over and across time, across season and across space and studied the role played by the technology, irrigation and relative prices in explaining the changes in area production and yield of rice. The growth rates of area production and yield indicated considerable variations across the districts over seasons and over time. The author suggested that in terms of prospects for increased paddy production in the state, it is unlikely that the area under paddy can be increased. There is scope for increased paddy production through changes in technology, particularly HYV seeds and fertilizer consumption. However this can be effective only if irrigation facilities are utilized efficiently.

Rao, K. P. C. (86) studied the growth trends of rice production and the factors responsible for it in Andhra Pradesh during the kharif and rabi season by using both the decomposition analysis as well as the growth rates. The study indicated that the growth of rice production own more to the gains in productivity rather than to the expansion of area under rice. There was a marked acceleration in the growth rates during the post green revolution period. Growth rates were faster in rabi season than the kharif season. Percentage area under HYV seeds influenced productivity significantly in both the seasons.
A.E.R.C. Research Study \textsuperscript{27(86)} examined whether there is any relationship between size of holding adoption of new technology and yield of paddy in Tamilnadu. Dosage of chemical fertilizer to the rice crop have risen very significantly irrespective of the size of the holding. The yield of paddy in the studied area has increased very significantly but the increase in the yield does not seem to have any relationship with the size of the holding.

Mahendrak, S. \textsuperscript{28(87)} analysed the unadjusted and weather adjusted growth rates of food grain production. The estimated results showed that inclusion of rainfall index in the trend analysis equation has improved the value of $R^2$ in most of the state which indicates that rainfall was able to explain major part of the variations in the food grain production. The analysis further revealed that differences in quality and quantity of irrigation might be the major factor that influenced inter-state variations in growth and instability in food grain production. The incidence of poverty across states revealed that generally this ratio was lower in the state where instability declined with high growth. On the other hand, the state which recorded increasing instability with low growth showed, very high incidence of poverty.

Desai, D.K; Gandhi, M. \textsuperscript{29(88)} studied the trend of rice production and productivity at the national level and at dis-aggregated levels of state and districts in post green revolution period. The average of Triannium were use to take case of the problems of variations due to weather at the beginning and the end points. The district analysis of rice production and productivity showed that rice research has to be more location specific. Even
after evolving varieties and practices specific to particular location, the impact of research recommendations is not assured because the variations in the socio-economic factor within a specific location.

Kalirajan, K.P. (1990) demonstrated the dynamic nature of new rice technology particularly in relation to the changing demands placed upon agricultural research without serious external constraints including risk. The study showed that new paddy varieties have better field performance measured in terms of productivity, economic efficiency, net profit and assesses the distribution of benefits. The study suggested direction for further research to increase productivity and to improve monetary gains and their distribution.
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