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# IMPACT OF NEW AGRICULTURAL TECHNOLOGY IN ANDHRA PRADESH

Talluri Yesobu

**ABSTRACT**

*The major preoccupation of the first generation of development economists in 1950 has been the initiation and acceleration of economic growth on the assumption that growth will automatically lead to a more equitable distribution of income and thus be more conducive to social justice. The experience of the developing countries in the last two decades has shown that in spite of respectable achievements in the rates of growth in Gross National Product, social equity aspects of development record have turned out to be disappointing and it has been tragic that the low end poverty groups have not received more of the benefits of growth. In India, different strategies based on different models have been used for achieving rapid progress in agriculture. The programmes like grow more food campaign were initiated in the country with the objective of encouraging and assisting cultivators in increasing their production and income with special emphasis placed on bringing the idle land under the plough. But it has failed to eliminate the weaknesses in Indian agriculture and benefited only the affluent farmers, neglecting the small farmers and others.*

**KEYWORDS :***New Agricultural Technology , major preoccupation , economic growth.*

**Short Profile**

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## INTRODUCTION

It was realized that efficient utilization of resources in the farm sector depends on the education of farmers in the proper utilization of resources. The new agricultural technology was seen as setting off a Green Revolution or a Seed Fertilizer Revolution and the earlier gloomy prediction, has lost its validity in the context of new technology. The estimates of income inequality indices indicate an overall decline in the farm income inequality in the district. The objective is the impact of new agricultural technology on yield and farm business income of sample farmers in Kurnool district of Andhra Pradesh. The study makes use of both secondary and primary data for analysis and arriving at conclusions. The schedules specifically designed for the study are canvassed through personal interview. For the collection of primary data, a multi-stage sampling frame is used. The information concerning family size, size of holding, operated area, leased-in land, leased-out land, area under irrigation, cropping pattern area under local varieties and high yielding varieties of paddy and sunflower crops, cost of cultivation of various crops grown labour cost, input costs, gross farm income, farm business income, non-form income, asset position, etc. are collected.

The major preoccupation of the first generation of deve-

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lopment economists in 1950 has been the initiation and acceleration of economic growth on the assumption that growth will automatically lead to a more equitable distribution of income and thus be more conducive to social justice. The experience of the developing countries in the last two decades has shown that in spite of respectable achievements in the rates of growth in Gross National Product, social equity aspects of development record have turned out to be disappointing and it has been tragic that the low end poverty groups have not received more of the benefits of growth.

The goals of development have been viewed and interpreted in a broader context than simply growth in Gross National Product. The situation revealed that the lack of income generation and inequitable distribution have kept more people in hunger than has a failure to expand food production. The poverty problem is a reflection of low levels of per capita income but highly unequal distribution patterns are also important. It is also realized to reduce hunger, the employment and income effects of agricultural development are much more important than increasing food output per se. This calls for redistribution with growth or reduction of absolute poverty or meeting of basic human needs elements of a revised development strategy and this change of emphasis from national product to individual welfare provoked economists, policymakers and politicians to think that the twin objectives of growth and social justice are conflicting and contradictory rather than complementary.

In India, different strategies based on different models have been used for achieving rapid progress in agriculture. The programmes like grow more food campaign were initiated in the country with the objective of encouraging and assisting cultivators in increasing their production and income with special emphasis placed on bringing the idle land under the plough. But it has failed to eliminate the weaknesses in Indian agriculture and benefited only the affluent farmers, neglecting the small farmers and others. It was realized that efficient utilization of resources in the farm sector depends on the education of farmers in the proper utilization of resources.The community Development and National Extension Programmes were initiated during 1950. During 1960 in India by rapid adoption and use of modern technology in agriculture, with a view to gain self-sufficiency in food grains, a basic requirement for self-reliance in the development process and to make far greater and widespread use of modern methods of production and to bridge the gap between demand and production by application of the latest advances in the science of agriculture and to raise the level of farm income to enable agriculture to contribute directly to economic growth, New Agricultural Strategy has been evolved during mid-sixties. The introduction of high yield crop varieties is one of the more significant changes taking place in India agricultural sector and thus technological change concealed under better training, research, extension and institutional framework plays a very crucial role in minimizing the gap between such production potential and actual level of production since the yield potential and income generating capacity of the modern variety are significantly superior to those of the traditional crops, when properly cultivated.Thus the new technology was seen as setting off a Green Revolution or a Seed-Fertilizer Revolution. These advantages have led some observers like Brown to predict the end of food grain problem in less developed countries and the beginning of an era of worldwide surplus production.

## TECHNOLOGICAL CHANGE AND AGRICULTURAL GROWTH

The New Strategy of Agricultural Development consists of (A) High yielding variety programme, (B) Incentive paddy for the producer farmers, (C) Development of infrastructure consisting of credit, marketing,

storage, research, education and training, power generation, transport and communications and administration(D) Development of irrigation facilities, (E) Supply of all non-traditional production inputs like fertilizers, pesticides, seeds, etc., (F) Plant protection and pest control operations, (G) Multiple cropping programme, (H) Dry land farming and (I) Small farmers and marginal farmers development programmes.

The new varieties have been designed to the highly responsive to fertilizer intake and as such, along with the spread of high yielding variety of seeds, the consumption of fertilizers has increased significantly since mid-sixties in India. With increasing dosages of fertilizer, the output from traditional varieties grows only to a limited extent, whereas the new varieties show increasing yields up to a very high level of fertilizer input.Traditionally, the level of consumption of fertilizer in India has been very low. The fertilizer responsiveness of the new high yielding varieties, it is not surprising that almost all studies in India show a higher level of fertilizer consumption by the adopters of high yielding varieties, compared to their traditional counterparts. The use of fertilizer in most parts of India falls short of the recommended dosage. Assured supply of water is a prime condition for intensive application of fertilizers. Absence of this condition over large parts of the country is one of the important factors which hamper a more, rapid increase of fertilizer consumption. In India, rabi crops (food as well as non-food crops) account for only one-third of our agricultural production. Yet they account for three-fifths of the total fertilizer consumption.This is because of the better assurance of availability of irrigation or sub-soil moisture for rabi crops. The new varieties, which are resistant to one type of pests might be susceptible to attacks from others which have remained dormant for many years. The greatest success of the new varieties of wheat, compared with the new paddy varieties in terms of yield, consistency and adoption rate, is largely due to the superior pest-resistant qualities of the former. In addition to the physical and biological methods of pest control, methods of chemical control through the use of pesticides are being increasingly used in India.

The new agricultural technology was seen as setting off a Green Revolution or a Seed Fertilizer Revolution and the earlier gloomy prediction, has lost its validity in the context of new technology. The new technology which is said to herald the transformation of agriculture from a traditional to a modern one brought in its wake many short and long run implications, for the economy in general and for the farm sector in particular. In short run effects of the new technology is an increase in the incomes of the adopters but a still more important aspect is its effect on the pattern of income distribution among farmers of different sizes because the new technology is scale neutral but not resource neutral. In the words of Myrdal, although in theory the new seeds and fertilizers are neutral to scale, in practice they are not. It is held that the new technology with its resource bias in favour of big farmers has led to the widening of existing inequalities. On the contrary, some studies observe that the small farmers are in the forefront in the adoption of new technology and therefore, there is a reduction in inequalities. Thus there is no consensus among researchers as to the exact impact of new technology on income distribution.

The International Rice Research Institute and Agricultural Development Council, Consequences of small farm mechanization, which principally provides evidence that corroborates the conclusions that emerge from a critical examination of previous mechanization studies. Some distributional implications of mechanization are also touched upon in one general paper on mechanization increases food output, it would benefit all classes of consumers through lower food grain prices, while in the absence of out-put increases and with labour displacement, there could be adverse distributional consequences. However, in this

context it is important to note that even where there are output gains these would not necessarily pass on to the poor. The prices, in a context where there is a strong upward pull in Government fixed procurement prices a pull exercised by the larger farmers, whose position has been consolidated economically and politically with the new technology.

The new technology associated with the high yielding seed varieties was introduced; its implications for farms of different size categories became a major issue of debate. The proponents of new technology contended that it was scale neutral, that is, new inputs like fertilizers, insecticides and seeds were divisible and could be used in the same proportion by both the large and small farmers alike. However, opponents of new technology pointed to the indivisibility of machinery which could be more optimally exploited by the large farms, to which the proponents, while admitting the role of tractors and tubewells under new technology replied that their using time was divisible, and that it was possible for even a small farmer to hire tractors time in accordance with his farm size. On the other hand, the opponents like Griffin argued about the imperfections in factor markets and the small farmers limited access to it. Since most of the inputs had to be purchased from the market with cash or through cooperatives, or banks and because of unequal access to credit and cooperative resources by the farmers of different size categories, the opponents argued that the new technology had widened the disparity between the poor and rich farmers in the country-side.

The estimates of income inequality indices indicate an overall decline in the farm income inequality in the district. The more equal adoption of new farm technology has significantly reduced income inequality. The results of the study are based on only two separate crop years of a single district, and the district is an IADP in which the Government took more interest such as special arrangements made for the supply of new production inputs and credit and for training and educating the farmers in the use of new technology all this did help in reducing the early inequality in the rates of adoption of new technology among operations of small and large farmers and alsothe income inequality since the Government's investments in infrastructure facilities enabled all size groups of farmers to benefit from new technology. The inequality in the rates of adoption between small and big farmers dropped and so did the farm income inequality.The agro-climatic and socio-economic conditions in different regions. The area-specific studies are comparatively limited in number, which are of great importance in view of vast variations in the implementation of agricultural policy programmes. The objective is the impact of new agricultural technology on yield and farm business income of sample farmers in Kurnool district of Andhra Pradesh.The study makes use of both secondary and primary data for analysis, drawing inferences and arriving at conclusions. The sources of secondary data are Statistical Abstracts of Andhra Pradeshand District hand Book, Kurnool.The schedules specifically designed for the study are canvassed through personal interview.

## SAMPLE DESIGN

For the collection of primary data, a multi-stage sampling frame is used. All the Mandals in Kurnool district on the basis of Percentage of irrigated area to total cultivated area (with above 50 per cent and below 50 Per centof irrigated area) since irrigation is the pre-requisite for the adoption of new technology. From each section one mandal has been selected randomly in the district and from each mandal, one village have been selected at random in Kurnool district of Andhra Pradesh.The required information and relevant data are collected through personal interview. The information concerning family size, size of

holding, operated area, leased-in land, leased-out land, area under irrigation, cropping pattern area under local varieties and high yielding varieties of paddy and sunflower crops, cost of cultivation of various crops grownlabour cost, input costs, gross farm income, farm business income, non-form income, asset position, etc. are collected. All these data are arranged in various form of tables and to critically analyze with the help of statistical tools.

## IRRIGATION

The irrigation is one of the fundamental factors in the adoption of new agricultural strategy. Assured irrigation facilities not only help in increasing productivity but their availability is a precondition for application of the productivity increasing inputs of new agricultural strategy. It thus helps in increasing production per unit of land, particularly when used in an appropriate combination with other inputs. It is now a proved fact that output per acre is higher in irrigated lands than in dry lands in India. The main source of irrigation in the area under study is canals, bore wells, tanks, tube wells and others provide the irrigation in the study area. The percentage of irrigated area to total area of sample farmers is presented in Table-I.

**Table-I**
**Area Irrigated to Total Area of Sample Farms in Kurnool District of Andhra Pradesh (Hectares)**

| Mandals | Total Area | Area irrigated | % of area irrigated to total area |
|---|---|---|---|
| Panyam | 115.69 | 78.62 | 37.07 |
| Velgode | 153.65 | 117.44 | 76.43 |
| Total | 269.34 | 196.06 | 72.79 |

Source: Field Data.

From the Table-I shows that the percentage of area irrigated to total area of the sample farmers in panyam and velgode are 37.07 per cent and 76.43 per cent respectively. It shows that sample farms in velgode mandal have better irrigation facilities. As such, velgode has higher potentiality for the adoption of new technology than the other panyam mandal.

## CROPPING PATTERN

The inherent and added qualities of land, the varieties of crops raised on land, the proportion of land put under different crops and the number of times the land is cultivated during the some of the important points concerning the land use pattern. The main crops raised in the villages under study are paddy, Jowar, sunflower, Chilies. The differences in irrigation facilities are reflected in the variation in crops raised in the two mandals under study. In panyam mandal, sunflower is the predominant crop, while paddy is important crop in velgode mandal. The cropping pattern of sample farms is presented in Table-II.

**Table – II**
**Cropping pattern of Sample Farms in Kurnool District of Andhra Pradesh (Hectares)**

| Crops | Panyam | | Velgode | |
|---|---|---|---|---|
| | Cropped area | Per cent | Cropped area | Per cent |
| Paddy | 35.98 | 34.06 | 92.44 | 67.19 |
| Sunflower | 69.65 | 65.93 | 45.13 | 32.81 |
| Total | 105.63 | 100.00 | 137.57 | 100.00 |

Source:-Field Data.

From the Table-II observe that paddy and sunflower are the most important crops in the two mandals. Comparatively more area is under sunflower in panyam mandal than other crop grown and paddy in velgode mandal of the total cropped area. In panyam mandal sunflower accounts for 65.93 per cent of the cropped area. Next in importance is paddy which accounts for 34.06 per cent of the cropped area. In velgode mandal paddy is raised on 67.19 per cent while the area under sunflower is 32.81 per cent of the cropped area. It is quite indicative that this is due to the availability of better irrigation facilities in this mandal.The adoption of high yielding varieties is more common in the mandals. The important local and high yielding varieties of paddy and sunflower grown in the study area. As velgode is more irrigated than panyam mandal, the area under high yielding varieties is more in the former than in the latter. The distribution of area under local and high yielding variety of paddy and sunflower is given in Table-III.

**Table - III**
**Area under Local and High Yielding Varieties in Kurnool District of Andhra Pradesh**
**(Hectares)**

| Mandals | Paddy | | | Sunflower | | |
|---|---|---|---|---|---|---|
| | Local | HYV | Total | Local | HYV | Total |
| Panyam | 3.65 (10.15) | 32.33 (85.85) | 35.98 (100) | 2.38 (3.41) | 67.27 (96.58) | 69.65 (100) |
| Velgode | 6.87 (7.43) | 85.57 (92.56) | 92.44 (100) | 3.86 (8.55) | 41.27 (91.44) | 45.13 (100) |

Source:-Field Data.

From the Table-III revealed that of the total area under paddy, local variety accounts for 10.15 per cent and 7.43 per cent in panyam and velgode mandals respectively, while high yielding variety ranges between 85.85 per cent the 92.56 per cent in the mandals. The total area under sun flower, local variety accounts for 3.41 per cent and 8.55 per cent in panyam and velgode mandals respectively while high yielding variety ranges between 96.58 per cent the 91.44 per cent in the study area.Though panyam is placed in the category of less irrigated mandal, in terms of the area under high yielding variety of paddy, the sample farms of panyam indicate that it is on par with velgode mandal. The differences in yield per hectare from village to village arise due to variations in soil conditions, fertilizer and other inputs used and also due to differences in irrigation facilities and adoption pattern. The average yield per hectare of both local and high yielding varieties in the Mandals under study is given in Table-IV.

**Table – IV**
**Average Yields of Paddy and Sunflower in Kurnool District of Andhra Pradesh**
**(Kgs per hectare)**

| Mandals | Paddy | | | Sunflower | | | |
|---|---|---|---|---|---|---|---|
| | Local | HYV | t-value | Local | HYV | t-value | DF |
| Panyam | 4125 | 5813 | 7.656** | 1625 | 2015 | 3.324** | 99 |
| Velgode | 4875 | 6758 | 4.873** | 1875 | 2625 | 5.127** | 167 |

Source:Field Data.Note: ** Significant at 1 per cent level

From the Table-IV shows that the yields level of high yielding variety of paddy is higher in all the two mandalsvis-a-vis local varieties. The difference between local and high yielding variety of paddy among mandals is explained by variation in irrigation facilities in the mandals, as

the realization of yield potential of high yielding variety depends, inter alia, on the adequate and timely application of water. In the case of sunflower also the average yields of high yielding variety are higher than local varieties in the Mandals. The slight difference of 1688 kgs per hectare between local and high yielding variety of paddy and 390 kgs per hectare local and high yielding variety of sunflower in panyam may be to lack of irrigation facilities, as the yield superiority f of high yielding variety is not established there. The benefits of new technology can be obtained only when irrigation is assured. The difference in the yields of local variety and high yielding variety of paddy is 1875kgs per hectare and 750 kgs per hectare local and high yielding variety of sunflower in velgode mandal. The differences in the mean yields of high yielding variety and local variety of paddy and sunflower in the sample villages have been tested. The differences in the mean yields of high yielding variety and local varieties of paddy in the two mandals are statistically significant. Hence, we reject the null hypothesis ( ~ =0) and accept the alternative hypothesis( ~ > 0). Despite irrigation disparities among the mandals, the yields are significant statistically between local variety and high yielding variety of paddy. The significant difference between yields of local variety and high yielding variety of paddy in the two mandals may be due to the fact that though there is difference in the area under high yielding variety. In panyam mandal the sample farmers cultivated high yielding variety in the available irrigated area, thereby the yield of high yielding variety becomes significant. The statistically significant difference in the mean yields of high yielding variety and local variety of sunflower in the two mandals. In spite of the fact that velgode mandal has better irrigation facilities than panyam mandal, the yield differences of local variety and high yielding variety are significant in both the Mandals. Though the area under local variety of sunflower is more than that of high yielding variety in panyam mandal, the yield differences, despite irrigation facilities turn out to be significant on the sample farms of panyam mandal. It means that though the area under high yielding variety is less than local variety in panyam mandal, yield superiority of high yielding variety over local variety is highlighted. The farm business income which accrues to them after deducting paid-out costs (Cost A2) from Gross Farm Income (GFI). The expected trend is that the farm business income in respect of high yielding varieties is higher than that of local varieties. The data relating to the farm business income of sample farmers of the two Mandals for both local and high yielding varieties is presented in Table-V.

**Table-V**
**Farm Business Income of Local Variety and High Yielding Variety of Paddy and Sunflower in Kurnool District of Andhra Pradesh**
**(Rs in per Hectare)**

| Crop | PANYAM | | | VELGODE | | |
|---|---|---|---|---|---|---|
| | Gross farm Income | Cost $A_2$ | Farm Business Income | Gross farm Income | Cost $A_2$ | Farm Business Income |
| **PADDY** | | | | | | |
| LOCAL | 47439 | 29343 | 18096 | 56648 | 33769 | 22879 |
| HYV | 65697 | 39452 | 26245 | 78435 | 47456 | 30979 |
| **t-value** | **7.654**** | | | **5.546**** | | |
| DF | 99 | | | 167 | | |
| **SUNFLOWER** | | | | | | |
| LOCAL | 54032 | 19454 | 33578 | 59213 | 20895 | 38318 |
| HYV | 66052 | 25369 | 40683 | 89118 | 30786 | 48332 |
| **t-value** | **4.1356**** | | | **4.5647**** | | |
| DF | 99 | | | 167 | | |

Source: Field Data.
Note: ** Significant at 1 per cent level

From the Table-V observers that the data it is clear that the farm business income of high yielding varieties is higher than the farm business income of local variety in the mandals under study for both paddy and sunflower. In the case of paddy, though the paid-out costs are higher per hectare for high yielding variety, than those for local variety, the gross farm income and as such farm business income are still higher. The difference between the average farm business income for high yielding variety and local variety of paddy is highest in velgode mandal as compared with the other mandal. The fact that in two mandals, irrespective of irrigation disparities, the farm business income from high yielding variety of paddy is found higher as compared to local variety.

Regarding the sunflower, the highest farm business income for high yielding variety per hectare is recorded on the sample farms of mandal and in the case of local variety of sunflower, the sample farms of velgode record highest farm business income, the data reveals that the Cost A2 of high yielding variety is more than that of local variety in mandals. Despite the fact that the cost of cultivation per hectare of high yielding varieties are higher than that of local varieties in respect of both the crops in all the Mandals, the farm business income from high yielding varieties are much higher than that of local varieties indicating the higher profitability of high yielding variety technology.The difference in the mean farm business income of local and high yielding variety of paddy in the two mandals is statistically significant. Thus the results show that the farm business incomes from high yielding variety of paddy are significantly different from the farm business income of local variety in the mandal. It means that irrespective of inter variation in irrigation and other facilities like input marketing and credit, the performance and success of high yielding variety of paddy in terms of farm business income is found superior to that of local variety in two mandals. The difference between local and high yielding varieties in mean farm business income is statistically significant in the mandals. It means that the farm business incomes from high yielding varieties on sunflower are significantly different from the farm business income from local varieties in the two mandals. The estimated results of Cobb-Douglas production function for pooled analysis of all farm sizes of Kurnool district for local variety and high yielding variety are presented in Table-VI.

**Table-VI**
**Coefficients of Production Function and Related Statistics for Sample Farms in Kurnool District of Andhra Pradesh**

| Inputs | Production elasticity of | |
|---|---|---|
| | Local Variety | HYV |
| $X_1$ (Landholding) | 0.2618** (0.0638) | 0.0949@ (0.1712) |
| $X_2$ (Seeds) | 0.3149** (0.1116) | 0.5243** (0.0391) |
| $X_3$ (Fertilizers and pesticides) | 0.2129* (0.1375) | 0.4313** (0.0689) |
| $X_4$ (Irrigation charges) | 0.05118* (0.1113) | 0.0098@ (0.01654) |
| $X_5$ (Human labour) | 0.5433** (0.2135) | 0.0654@ (0.04321) |
| $X_6$ (Machinery used) | 0.1132@ (0.5431) | 0.0987@ (0.0765) |
| | N = 270 | N = 270 |
| | $R^2$ = 0.8935 | $R^2$ = 0.9454 |

Source:-Field Data.
$R^2$:Coefficient of multiple determinations
@ :Not significant
* :Significant at 5 per cent level
** :Significant at 1 per cent level

The Table-VI shows that the regression co-efficient of estimated production function for high yielding variety turns out to be significant in the case of seeds and fertilizers and pesticides. But for local variety, it is significant for all input factors. The co-efficient of human labour turn out to be significant for local variety but it is not significant for high yielding variety. It may be mentioned here that the use of modern inputs for high yielding variety cultivation has relatively lessened the importance of human labour.

Further, not significant elasticity of machinery use for high yielding variety points to the fact that it has yet to make its impact on the farm economy of the district. However, the production elasticity in the case of machinery bears a positive sign and it clearly demonstrates that the farmers of Kurnool who grow high yielding variety have taken to the mechanization of agriculture practices. The land has due importance in the process of farm production for local variety and high yielding variety. The coefficients of land 0.2618 for local variety which is significant at 5 per cent and 1 per cent probability level. For high yielding variety cultivation, the coefficient is 0.0949 though positive is not significant. It means by increasing land input by 100 per cent, holding all other inputs constant at their geometric mean level, the gross output increases for local variety by 26.18 per cent and for high yielding variety by 9.4 per cent in Kurnool district. This supports the hypotheses that in the case of more modernized relative importance of land decreases. It supports the contention that high yielding variety technology is land saving.The co-efficient of fertilizers and pesticides are 0.3149 for local variety and 0.5243 for high yielding variety which are significant at 5 per cent and 1 per cent probability levels respectively. The magnitude of production elasticities for inputs mentioned above in the Kurnool district are less than unity indicating thereby the operation of law of diminishing returns. Thus if an input is increased by one per cent, the output may increase by less than 1 per cent, holding other inputs constant at their geometric mean level.The value of $R^2$, the coefficient of multiple determinations, both for local variety and high yielding variety turns out to be significant. The six variables included in this study explain 89 and 95 per cent of variations in gross output for local variety and high yielding variety respectively in Kurnool district. The remaining amount of unexplained variation may be due to the variations in the technique of production used by different farmers, climatic and other natural factors, variation in management, etc. or to variables not included in the analysis.

The sum of production elasticity computed from the Cobb-Douglas production function gives the returns to scale which indicates the proportionate increase in the output when all the inputs are increased by 1 per cent. It this sum is less than, equal to or greater than unity, it indicates decreasing, constant or increasing returns to scale respectively. The sum of production elasticities is given in Table-VII.

**Table-VII**
**Returns of Scale**

| S.No. | Variety | $b_1$ | Returns to scale indicated by t-test |
|---|---|---|---|
| 1. | Local | 1.987 | Constant |
| 2. | HYVs | 1.235 | constant |

Source:Field Data.

From the Table-VII shows that the sum of production elasticities in the case of local variety and high yielding variety is 1.987 and 1.235 respectively. The increasing returns to scale are indicated by the table as the sum of elasticities is greater than one for both local and high yielding variety. However, to test the validity of the generalization, the sum of the regression coefficients is tested for their deviation from unity. The t-test indicates that both the sum of elasticities is not significantly different from one. Hence the returns to scale are found to be constant. The geometric means and marginal value productivities of the various inputs are given in Table-VIII.

**Table-VIII**
**Geometric Means and Marginal Value Productivities of Factors of Production Variables in Kurnool District of Andhra Pradesh**

| Inputs | Local | | HYVs | |
|---|---|---|---|---|
| | G.M | M.P | G.M | M.P |
| $X_1$ (Landholding) | -1.75 | 2.87 | 1.98 | 57.98 |
| $X_2$ (Seeds) | 1.94 | 1.21 | 86.12 | 7.51 |
| $X_3$ (Fertilizers andpesticides) | 1.76 | 0.65 | 112.87 | 4.13 |
| $X_4$ (Irrigationcharges) | 7.87 | 0.87 | 5.76 | 12.91 |
| $X_5$ (Labour charges) | 2.87 | 3.78 | 38.98 | 1.87 |
| $X_6$ (Machineryused) | 2.54 | 3.34 | 51.87 | 1.45 |
| | 6.78 | | 734.54 | |

Source:Field Data.

From the Table-VIII observed that in the mean level of inputs is higher for high yielding variety. The marginal value productivity of an input shows the expected addition to gross output caused by the addition of one unit of the resource input concerned while other inputs are held constant. The marginal value productively helps in estimating the efficiency of prevalent factor proportions in agriculture of the district under study and year in which the study is conducted.The marginal products of fertilizers and pesticides are higher for high yielding variety than for local variety. The marginal value productivity of land per hectare turns out to be significant. The marginal value productivities are higher for high yielding variety than local variety. The marginal value productivities for fertilizers and pesticides of high yielding variety and local variety respectively. While the marginal value productivity of labour is positive in the case of high yielding variety, and local variety.It is generally believed that the new technology results in increased yield/farm business income of farmers irrespective of their holding size. Differences in irrigation reflect differences in the area under high yielding varieties between the two Mandals under study. However, the yield of high yielding varieties is significantly different from that of local variety of paddy/sunflower in velgode Mandals and the yielding variety is maximum in the highly irrigated mandal. The superiority of high yielding varieties over local variety in terms of yield/farm business income and the effectiveness of irrigation in realizing the yield potentiality of high yielding variety technology are thus established.The resource use and productivity of farms in the study area reveals that at a higher level of technology, high yielding variety of seeds, fertilizers and pesticides influence the yield significantly while in local variety technology, human labour, fertilizers, and landholding influence yield to a significant level. It is also revealed that in case of modernization of agriculture in the district, the relative importance of land decreases, thus

reaffirming the contention that high yielding variety technology is land saving.

From the findings of the study emerges the conclusion that inter-regional and intra-regional income in-equalities may be attributed to variation in irrigation, land concentration and imperfect factor markets. Unless these problems are effectively tackled, the benefits of new technology cannot percolate into small farms and backward regions. The disparities in irrigation can be overcome through the Governments' initiative in extending irrigation facilities to backward regions and creating community irrigation. With regard to the unequal distribution of land the solution lies in the effectiveimple-mentation of land reform measures. The imperfections in credit and input markets can be removed by reorienting the institutional set-up and planning appropriate price policies. Only then, the objectives of growth and social justice can be attained in the farm sector in India.

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