AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

*The World's Largest Open Access Agricultural & Applied Economics Digital Library*

**This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.**

**Help ensure our sustainability.**

Give to AgEcon Search

AgEcon Search
http://ageconsearch.umn.edu
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

Vol XXIV
No. 4

ISSN 0019-5014

CONFERENCE
NUMBER

OCTOBER-
DECEMBER
1969

# INDIAN JOURNAL OF AGRICULTURAL ECONOMICS

INDIAN SOCIETY OF
AGRICULTURAL ECONOMICS,
BOMBAY

# CAPITAL FORMATION IN AGRICULTURE IN MADHYA PRADESH

J. S. SISODIA*

*Department of Agricultural Economics*
*College of Agriculture, Indore (M.P)*

In recent years, technical changes in varying degrees in Indian agriculture are taking place in an ever increasing tempo and, while the State has played an active role in inducing these changes in many cases, farmers are also showing a remarkable ability to adapt themselves to changing circumstances. The substantial increase in the use of small diesel and electric pumps in recent years by farmers in India for minor irrigation is a proof not only of their adaptability but also their ability to use relatively complicated machinery. In this context, the study of capital formation in agriculture assumes great importance.

An attempt has been made in this paper to study the capital formation in agriculture in 19 districts out of the 43 districts of the new Madhya Pradesh State. The study covers the entire area of old Madhya Pradesh (Mahakoshal region) and Bhopal regions.

The term 'Capital' in a broader sense include, besides physical durable assets, the circulating or working capital, and the resources invested in human beings and in the organization of economic activities. Since on detailed and up-to-date information is available regarding the above items of capital, we have confined this study to the items of physical durable capital.

*Objectives*

The objectives of this paper are (*i*) to analyse the trends and rate of growth in the stock of capital formation in selected districts of the new Madhya Pradesh, (*ii*) to account for this variation between different districts, and (*iii*) to study the compositional changes in the stock of durable physical assets.

*Characteristic Features of the Region*

Mahakoshal and Bhopal regions are spread over an area of 2,59,777 sq. km. which constitute about 59 per cent of the new Madhya Pradesh. Mahakoshal region comprises of 17 districts, namely, Sagar, Damoh, Jabalpur, Mandla, Hoshangabad, Narsimhapur, East Nimar, Balaghat, Batul, Chhindwara, Seoni, Durg, Raipur, Bilaspur, Surguja, Raigarh and Baster while Bhopal region includes only Sehore and Raisen districts. These districts are overwhelmingly rice and wheat producing areas with the exception of East Nimar where a little more than 40 per cent area is put under cotton crop and thus falls in the cotton-jowar zone.

*The author is very grateful to Shri K. C. Patel, Senior Research Assistant, for providing the data for the years 1966-67 and 1967-68 used in the study from the Directorate of Land Records, Gwalior. The help of Shri C. S. Jooloor, Statistical Assistant, of this College in statistical computations is gratefully acknowledged.

The density of population in the region is 186 (per sq. mile) as against 189 in Madhya Pradesh as a whole. The availability of land per capita in the region is 3.83 acres as against 3.38 acres in the State as a whole. About 35 per cent area is under cultivation and 6.05 per cent area is under irrigation as against 5.56 per cent in the State as a whole.

*Material and Methods*

The new Madhya Pradesh is formed by four constituent units of Mahakoshal, Bhopal, Vindhya Pradesh and Madhya Bharat regions. The present study covers only the 17 districts of Mahakoshal and 2 districts of Bhopal regions as no annual livestock census is conducted in the regions of Madhya Bharat and Vindhya Pradesh and as such no figures for these regions are available since 1955-56 onwards. The study covers the period of 13 years, *i.e.*, 1955-56 to 1967-68 and tries to draw some useful inferences on the basis of the analysis undertaken.

As already stated, the study is confined only to durable physical assets, particularly to the following categories : (*i*) cultivated land, (*ii*) rural houses, (*iii*) irrigation, (*iv*) work animals and, (*v*) farm equipments. The category of land include current fallow and net sown area while by irrigation we mean net area irrigated by different sources in the selected districts of Madhya Pradesh. Working animals include working bullocks, cows, and he-buffaloes which are used by the cultivators in farming operations like ploughing, transportation, etc. Farm equipments include ploughs (wooden and iron), carts, cane crushers (power and bullock), pumps (diesel and electric) and tractors. Buildings refer to the occupied houses in villages and their number for different years have been calculated on the basis of the growth rate derived from the figures of 1951 and 1961 Censuses. Data on cultivated land, irrigated area, working animals and farm equipments have been obtained from the official publications[1] of the Directorate of Land Records, Gwalior.

Further, these assets have been valued for each of the 19 districts for each of the 13 years at constant prices prevailing in the year 1955-56. The value of cultivated land (irrigated and unirrigated) for 9 districts were obtained from the Sub-Registrar's and Superintendent Land Record's offices and the average value of land was worked out.[2] Houses have been valued on the basis of average cost of a rural house (Rs. 877) during 1949-50 derived from the first round of the NSS results for 125 villages as available from the National Income Committee Report.[3] This value figures have been used in our analysis because of non-availability of value data of houses for the year 1955-56. The difference in the values between the irrigated and unirrigated land is assumed by us to represent investment in irrigation in the entire study area, the total investment being obtained by multiplying the sum of the difference in value per acre by the total net area irrigated.

---

1. Annual Season and Crop Reports of Madhya Pradesh.
2. Prices (1955-56) used for valuation of various assets are listed below :
Land Rs. 332 per acre; Irrigation Rs. 295 per acre; Bullocks Rs. 335 each; Wooden plough Rs. 10; Iron plough Rs. 27; Carts Rs. 90; Sugarcane crusher : power Rs. 935; bullocks Rs. 325; Oil engines Rs. 1,798; Electric pumps Rs. 800; Houses Rs. 877; Tractors Rs. 8,000 each.
3. First Report of the National Income Committee, Government of India, April, 1951, p. 98.

The value of iron ploughs, oil engines, electric pumps, tractors in 1955-56 have been obtained from wholesale traders in Indore City market[4] through personal investigations. Information regarding the value of carts, wooden ploughs and bullocks were obtained by personal approach with the adopted cultivators for National Demonstration Plots in nearby villages.

Having valued the various assets for each district and for each year at the constant prices of 1955-56, aggregation of the values of various assets was done in the following manner: Aggregation of the values of all above assets (X). Aggregation excluding houses ($X_1$). Aggregation excluding houses and land ($X_2$) and aggregation excluding houses, land and irrigation ($X_3$).

From the aggregated time-series data, index numbers of stock of durable physical capital in agriculture for 19 districts have been built up from 1955-56 to 1967-68 using 1955-56 as the base year. In order to find out the percentage annual rate of growth of different combinations of assets, a linear equation of the type $y=a+bx$ was fitted to the indexes of various combined assets for each district.

*The Trend in the Stock of Capital in Agriculture*

Table I which showed the trend values of index numbers of various combinations of assets from 1955-56 to 1967-68, revealed that, whatever series we take, the pace of expansion of stock of durable physical assets on farms in Madhya Pradesh has quickened considerably after 1960-61.

TABLE I—INDEX OF DURABLE PHYSICAL ASSETS ON FARMS IN MAHAKOSHAL AND BHOPAL REGIONS OF MADHYA PRADESH DURING 1955-56 TO 1967-68

| Year | All assets (X) | Assets excluding houses ($X_1$) | Assets excluding houses and land ($X_2$) | Assets excluding land, houses, irrigation ($X_3$) |
|---|---|---|---|---|
| 1955-56 .. .. | 100·0 | 100·0 | 100·0 | 100·0 |
| 1956-57 .. .. | 101·1 | 100·1 | 99·2 | 101·2 |
| 1957-58 .. .. | 103·0 | 101·1 | 105·3 | 102·0 |
| 1958-59 .. .. | 103·8 | 100·8 | 99·1 | 101·5 |
| 1959-60 .. .. | 105·6 | 101·7 | 102·5 | 102·5 |
| 1960-61 .. .. | 108·9 | 104·2 | 113·1 | 115·4 |
| 1961-62 .. .. | 107·3 | 101·1 | 95·6 | 94·2 |
| 1962-63 .. .. | 109·8 | 102·8 | 102·7 | 99·7 |
| 1963-64 .. .. | 111·8 | 104·1 | 106·2 | 104·5 |
| 1964-65 .. .. | 113·1 | 104·4 | 107·5 | 105·6 |
| 1965-66 .. .. | 114·0 | 104·7 | 105·8 | 105·9 |
| 1966-67 .. .. | 118·2 | 108·3 | 112·2 | 110·0 |
| 1967-68 .. .. | 120·0 | 109·2 | 110·6 | 108·7 |

4. Balkrishna Shah & Company, Indore Machinery House, Siyaganj, Indore.

It is also evident from the table that the increase in the stock of durable assets has been rapid in recent times particularly during the years 1966-67 and 1967-68. The percentage increase of 'all assets' (X) has been almost double as compared to the other combinations of assets in the entire study area. The category of 'implements and machinery ($X_3$)' including bullocks showed an increase of about 9 per cent during the period of 13 years.

*Comparative Rates of Growth in the Stock of Capital*

Table II gives the percentage of annual rates of growth of capital stock in agriculture in the selected districts of Madhya Pradesh during 1955-68. The table reveals that' 'all assets' (X), 'assets excluding houses' ($X_1$), 'assets excluding houses and land' ($X_2$), 'assets excluding houses, land and irrigation' ($X_3$) have shown an increase of 1.6 per cent, 0.7 per cent, 0.8 per cent and 0.6 per cent per annum respectively in the Mahakoshal and Bhopal regions of Madhya Pradesh.

TABLE II—PERCENTAGE OF ANNUAL RATES OF GROWTH : 1955-68

| District | X series | $X_1$ series | $X_2$ series | $X_3$ series |
|---|---|---|---|---|
| Sagar .. .. .. | 1·603 | 0·734 | 1·137 | 0·931 |
| Damoh .. .. .. | 1·486 | 0·347 | —0·535 | 1·027 |
| Jabalpur .. .. .. | 1·117 | 0·509 | 0·995 | 0·950 |
| Mandla .. .. .. | 2·752 | 1·135 | 0·293 | 0·187 |
| Hoshangabad .. .. | 1.514 | 0.991 | 0.861 | 0.567 |
| Narsimhapur .. .. | 1·317 | 0·689 | 1·765 | 0·112 |
| East Nimar .. .. | 1·987 | 0·759 | 0·773 | 0·226 |
| Balaghat .. .. .. | 1·276 | 0·663 | 1·303 | 1·894 |
| Betul .. .. .. | 1·510 | 0·688 | 1·073 | 1·024 |
| Chhindwara .. .. | 1·978 | 0·682 | 1·588 | 1·593 |
| Seoni .. .. .. | 1·691 | 0·892 | —0·099 | —0·325 |
| Durg .. .. .. | —0·172 | —0·304 | —0·139 | —0·262 |
| Raipur .. .. .. | 2·084 | 0·465 | 1·370 | 0·573 |
| Bilaspur .. .. .. | 1·514 | 0·553 | 2·356 | 0·913 |
| Surguja .. .. .. | 2·320 | 1·356 | 1·432 | 1·365 |
| Raigarh .. .. .. | 1·278 | 0·332 | 0·372 | 0·192 |
| Bastar .. .. .. | 2·086 | 0·813 | —0·448 | —0·324 |
| Sehore .. .. .. | 3·187 | 2·340 | 1·466 | 1·630 |
| Raisen .. .. .. | 2·393 | 1·827 | 2·494 | 1·840 |
| Mahakoshal and Bhopal regions | 1·595 | 0·682 | 0·839 | 0·617 |

Table II reveals a high degree of variation in the annual rates of growth in the stock of assets between different districts. The rate of growth per annum of 'all assets' varies from 3.18 per cent at Sehore to 1.11 per cent per annum at Jabalpur, Raisen, Sehore, Bastar, Surguja, Raipur, Seoni, Chhindwara, East Nimar, Mandla and Sagar districts have recorded higher rate of growth as compared to the entire study area. However, Durg district showed a decline in the total capital stock at 0.17 per cent per annum. This decline in the growth rate is partly due to the reduction in the number of working bullocks from 5,59,304 in the year 1955-56 to 5,45,897 in 1967-68 and partly due to the decrease of 0.5 per cent in cultivated area in 1967-68 over 1955-56. The statement in table II summarizes the ranges of percentage growth of stock.

As regards the rate of growth of ($X_1$) series, Sehore district showed the highest rate of increase (2.34 per cent per annum) followed by 1.83 per cent at Raisen, 1.35 per cent at Surguja and 1.13 per cent at Mandla. The other districts which show rates higher than the entire study area are Bastar, Seoni, Chhindwara, Betul, East Nimar, Narsimhapur, Hoshangabad and Sagar. The lowest rate of growth of this category is found at Raigarh district having only 0.332 per cent per annum. In this case also, Durg district showed a declining trend at 0.304 per cent per annum.

Balaghat district has recorded the highest rate of growth in respect of ($X_3$) series (1.89 per cent per annum) while Narsimhapur showed the lowest rate of 0.11 per cent per annum. The other districts which show rates higher than the entire Mahakoshal and Bhopal regions are Raisen, Sehore, Chhindwara, Surguja, Betul, Damoh, Jabalpur and Sagar. Here again, Durg district showed a decline in gross investment in the form of bullocks, implements and machinery. Seoni district too, had shown a decline in the rate of growth of the same series.

The rate of growth of $X_2$ series have been found to be higher at Raisen district (2.49 per cent per annum) followed by 2.35 per cent at Bilaspur, 1.76 per cent at Narsimhapur, 1.58 per cent at Chhindwara, 1.46 per cent at Sehore, 1.43 per cent at Surguja, 1.37 per cent at Raipur, 1.30 per cent at Balaghat and 1.13 per cent at Sagar district. Lowest rate of growth is found at Mandla being only 0.29 per cent per annum. The other districts, namely, Betul, Hoshangabad and Jabalpur have also shown higher rate of growth than the entire Mahakoshal and Bhopal regions. Two more districts, namely, Seoni and Damoh together with Durg have shown a decline at the rate of 0.09 per cent, 0.53 per cent and 0.13 per cent per annum respectively.

*Influences of Crucial Variables on the Growth of Stock of Capital*

It may be proper at this stage to probe into the influences of some the crucial variables on the growth of stock of capital in agriculture between different districts under study. Broadly, inter-district differentials in the growth rate of the stocks of capital on farms may be accounted for by (*a*) greater degree of urbanization, (*b*) size of holding, (*c*) extent of commercialization, and (*d*) income level. For this purpose, we associate the above factors only with the growth rates of $X_3$ series achieved in different districts. For making association easy, the districts have been grouped[5] as 'high', 'medium' and 'low' accordingly to the respective rate of growth of $X_3$ series. The relevant figures are presented in Table III.

5. High : more than 1 per cent per annum; Medium : between 0·5 to 1 per cent per annum; Low : less than 0·5 per cent per annum.

TABLE III—SOME VARIABLES ASSOCIATED WITH THE RATE OF GROWTH OF $X_3$ SERIES

| District | Rate of growth of $X_3$ series | Per cent of urban population (1961 Census) | Size of holding (acres) | Per cent area under commercial crops* | Gross income† per acre (Rs.) | Gross income† per worker (Rs.) |
|---|---|---|---|---|---|---|
| *High :* | | | | | | |
| Balaghat .. .. | 1·894 | 6 | 2·16 | 13·79 | 136·27 | 257·14 |
| Raisen .. .. | 1·840 | 5 | 12·37 | 13·82 | 101·56 | 418·78 |
| Sehore .. .. .. | 1·630 | 37 | 14·93 | 11·61 | 102·92 | 360·55 |
| Chhindwara .. .. | 1·593 | 13 | 2·71 | 20·23 | 78·56 | 237·25 |
| Surguja .. .. .. | 1·365 | 4 | 3·37 | 12·05 | 92·54 | 174·89 |
| Damoh .. .. .. | 1·027 | 13 | 4·17 | 10·43 | 98·52 | 337·88 |
| Betul .. .. .. | 1·024 | 8 | 2·85 | 15·18 | 77·92 | 220·10 |
| *Medium :* | | | | | | |
| Jabalpur .. .. | 0·950 | 36 | 1·83 | 8·34 | 81·54 | 281·64 |
| Sagar .. .. .. | 0·931 | 23 | 4·17 | 8·83 | 87·97 | 342·07 |
| Bilaspur .. .. | 0·913 | 8 | 1·82 | 8·03 | 131·80 | 284·15 |
| Raipur .. .. .. | 0·573 | 11 | 0·27 | 9·02 | 117·82 | 314·43 |
| Hoshangabad .. .. | 0·567 | 19 | 5·70 | 22·68 | 65·66 | 305·68 |
| *Low :* | | | | | | |
| East Nimar .. .. | 0·226 | 23 | 4·30 | 47·81 | 65·65 | 233·17 |
| Raigarh .. .. | 0·192 | 6 | 3·84 | 10·57 | 121·14 | 232·79 |
| Mandla .. .. .. | 0·187 | 5 | 4·06 | 16·15 | 74·49 | 187·60 |
| Narsimhapur .. .. | 0·112 | 12 | 5·70 | 6·31 | 91·05 | 371·30 |
| Durg .. .. .. | —0·262 | 12 | 4·35 | 11·05 | 99·88 | 309·86 |
| Bastar .. .. .. | —0·324 | 2 | 0·85 | 6·84 | 111·55 | 248·92 |
| Seoni .. .. .. | —0·325 | 6 | 2·71 | 16·41 | 89·37 | 221·54 |

*Source :* Statistical Abstract of Madhya Pradesh, 1961-62, Directorate of Economics and Statistics, Bhopal, p. 57.

* Commercial crops include fruits and vegetables, sugarcane, all oil seeds crops and cotton.

† This is a part of my Ph. D. Thesis on Regional Variations in Agricultural Development and Productivity in Madhya Pradesh, registered from Indore University during 1968.

The degree of urbanisation shows marked variation between the districts. Bastar and Surguja districts have a low degree of urbanisation whereas Sehore and Jabalpur districts have greater degree of urbanisation. In general the high and medium districts record higher degree of urbanisation, but in low rate districts, the degree of urbanisation in East Nimar, Narsimhapur and Durg is of the same order as in Sagar, Chhindwara and Damoh districts. Again, it is assumed that in areas where the size of holding is large, the increase in the rate of capital for-

mation would certainly be higher. Among low districts (except Narsimhapur and East Nimar), the size of holding appears to be small compared to the districts which show high and medium rate of growth of $X_3$ series. The same thing applies to the extent of commercialization. High and medium districts generally have larger area under commercial crops compared to the districts (with the exception of East Nimar and Seoni) which show low rate of capital formation.

The level of income per acre of cultivated land and per agricultural worker appears to be a crucial variable. High and medium districts have undoubtedly higher level of income per acre and per worker with the exception of Raigarh and Narsimhapur where income per acre and income per worker are comparatively higher.

*Change in the Pattern of Capital Formation*

In order to get a clear picture of the change in the pattern of capital formation in agriculture in different districts, we have calculated the percentage changes in different assets between 1955-56 to 1967-68. The relevant figures are presented in Table IV.

An examination of Table IV reveals that land has shown relatively very small increase (7.8 per cent) for the study area as a whole. For the districts, the range of variation is rather wide. Sehore district showed the highest increase of 36 per cent followed by Raisen (28 per cent), Mandla (18 per cent) and Seoni district (14 per cent) during the period under study. The percentage increase in land in Bilaspur district has been very small (1.4 per cent). However, Durg district showed a decline of 0.5 per cent during the period. Despite this, the range in variation in land is small as compared to that for any other assets taken singly. Irrigation showed greater percentage changes over the 13 years as compared to land, except in the case of Jabalpur, Betul and Sehore. Chhindwara and Bastar districts showed a decline ranging from 1.2 to 33.2 per cent. The overall percentage changes in land and working bullocks is in the same order in the entire Mahakoshal and Bhopal regions. Largest increase in bullocks is found in Balaghat (30 per cent) and Sehore (24 per cent) districts, whereas Seoni district has recorded the smallest increase (0.6 per cent).

Inter-district variations in the case of carts and ploughs (wooden) appeared to be very small as compared to those in irrigation with the exception of Bastar and Sehore where maximum percentage change in the case of wooden ploughs have taken place. On the contrary, the position is quite different for non-traditional implements.[6] The percentage increase for non-traditional implements in the entire study area as a whole are not only substantially larger but the inter-district variations are also substantially wider. In this case, however, bullock-drawn sugarcane crushers are an exception. Nearly half of the total districts under study did not have at all power-drawn sugarcane crushers and electric pumps during 1955-56 but the use of these two devices have increased gradually in the subsequent years as shown in Table IV.

6. Traditional implements : bullocks, carts and wooden ploughs. Non-traditional implements : iron ploughs, sugarcane crushers, power and bullocks, oil engines, tractors, electric pumps.

TABLE IV—PERCENTAGE CHANGE IN THE QUANTITY OF IMPORTANT ASSETS DURING 1967-68 OVER 1955-56

| District | Percentage increase or decrease in 1967-68 over 1955-56 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Land | Irrigation | Working bullocks | Carts | Tractors | Ploughs | | Sugarcane crushers | | Oil engines | Electric pumps |
| | | | | | | Wooden | Iron | Power | Bullocks | | |
| Sagar .. .. .. | 12·7 | 46·9 | 4·7 | 28·7 | 211·1 | 9·0 | 1,138·1 | 316·6 | 3·0 | 342·6 | 3,140·0 |
| Damoh .. .. .. | 10·8 | 25·4 | 13·2 | 38·3 | 146·1 | 10·2 | 2,845·4 | 7* | 506·2 | 4,150·0 | 35* |
| Jabalpur .. .. .. | 6·0 | 0·4 | 8·7 | 56·9 | 466·6 | 10·6 | 799·4 | 1,100·0 | —40·9 | 1,383·3 | 1,514·2 |
| Mandla .. .. .. | 18·2 | 105·4 | 3·3 | 34·5 | 500·0 | 8·6 | 280·0 | 145* | 48·0 | 2,200·0 | 29* |
| Hoshangabad .. .. | 8·5 | 104·0 | 6·7 | 8·4 | 271·2 | 13·5 | 1,854·5 | 500·0 | 172·7 | 500·0 | 195* |
| Narsimhapur .. .. | 8·2 | 239·4 | 12·0 | 13·1 | 64·7 | 8·3 | 2,000·0 | 525·0 | 52·4 | 546·6 | 224* |
| East Nimar .. .. | 8·8 | 90·3 | 14·4 | 23·3 | 514·2 | 6·9 | 37·1 | 470·0 | 10·0 | 646·5 | 4,080·0 |
| Balaghat .. .. .. | 5·0 | 13·8 | 29·6 | 4·7 | 71·4 | 8·9 | 263·8 | 4* | 28·3 | 867·6 | 800·0 |
| Betul .. .. .. | 7·8 | 2·7 | 6·9 | 42·8 | 455·5 | 23·0 | 117·2 | 1,085·0 | —3·0 | 238·4 | 568* |
| Chhindwara .. .. | 6·1 | —1·2 | 10·2 | 25·3 | 600·0 | 13·3 | 27·5 | 146·6 | 34·0 | 308·5 | 1,584·3 |
| Seoni .. .. .. | 14·4 | 24·7 | 0·6 | 6·3 | 83·3 | 8·0 | 14·0 | 200·0 | 48·0 | 209·8 | 17* |
| Durg .. .. .. | —0·5 | 11·8 | —2·3 | 11·6 | 211·1 | 4·1 | 631·6 | 16* | 37·4 | 923·5 | 1,870·0 |
| Raipur .. .. .. | 1·6 | 42·8 | 5·5 | 31·1 | 183·7 | 15·9 | 314·0 | 17* | 43·0 | 1,396·0 | 1,181·8 |
| Bilaspur .. .. .. | 1·4 | 70·0 | 3·8 | 19·7 | 709·0 | 16·3 | 4,041·3 | 1,050·0 | 18·8 | 359·0 | 1,580·0 |
| Surguja .. .. .. | 13·5 | 87·7 | 10·3 | —2·4 | 100·0 | 13·4 | 35* | 3* | 32·2 | 616·6 | 8* |
| Raigarh .. .. .. | 4·0 | 90·1 | 17·2 | 23·8 | 666·6 | 29·2 | 757·8 | 7* | 60·8 | 1,800·0 | 85·7 |
| Bastar .. .. .. | 14·8 | —33·2 | 7·6 | 18·2 | 250·0 | 44·5 | 3,985·7 | 300·0 | 58·4 | 182* | 17* |
| Sehore .. .. .. | 36·1 | 5·7 | 23·7 | 11·7 | 87·7 | 44·4 | 319·4 | 31* | —18·5 | 315·7 | 333* |
| Raisen .. .. .. | 28·4 | 431·0 | 14·8 | 21·3 | 215·9 | 23·6 | 364·0 | 3* | 38·0 | 722·5 | 48* |
| Mahakoshal and Bhopal regions .. | 7·8 | 30·2 | 7·8 | 18·2 | 212·2 | 16·0 | 115·8 | ·1,004·3 | 28·3 | 326·7 | 3,060·6 |

* Not used during 1955-56 but their numbers during 1967-68.

The change in the pattern of capital formation, as observed from the percentage increase or decrease over the 13 years, may again be reinforced by supplementing it with the data regarding supply intensities. Table V gives a comparative picture of the supply intensities of non-traditional implements in terms of numbers as per thousand acres of net sown area for all the 19 districts.

TABLE V—SUPPLY INTENSITIES OF SELECTED IMPLEMENTS AND MACHINERY

*(number per thousand acres of net sown area)*

| District | Iron ploughs | | Electric pumps | | Oil engines | | Tractors | |
|---|---|---|---|---|---|---|---|---|
| | 1955-56 | 1967-68 | 1955-56 | 1967-68 | 1955-56 | 1967-68 | 1955-56 | 1967-68 |
| Sagar .. .. | 0·019 | 0·209 | 0·009 | 0·260 | 0·082 | 0·317 | 0·074 | 0·202 |
| Damoh .. .. | 0·019 | 0·500 | 0·009 | 0·054 | 0·007 | 0·262 | 0·022 | 0·049 |
| Jabalpur .. .. | 0·161 | 1·353 | 0·013 | 0·203 | 0·023 | 0·320 | 0·026 | 0·137 |
| Mandla .. .. | 0·012 | 0·037 | 0·013 | 0·028 | 0·007 | 0·136 | 0·002 | 0·011 |
| Hoshangabad .. .. | 0·011 | 0·207 | 0·013 | 0·187 | 0·135 | 0·745 | 0·030 | 0·088 |
| Narsimhapur .. .. | 0·017 | 0·320 | 0·013 | 0·342 | 0·114 | 0·658 | 0·028 | 0·042 |
| East Nimar .. .. | 6·683 | 8·368 | 0·021 | 0·813 | 0·281 | 1·919 | 0·007 | 0·041 |
| Balaghat .. .. | 0·074 | 0·257 | 0·003 | 0·027 | 0·054 | 0·495 | 0·066 | 0·108 |
| Betul .. .. | 0·101 | 0·200 | 0·003 | 0·602 | 0·290 | 0·898 | 0·010 | 0·053 |
| Chhindwara .. .. | 0·026 | 0·031 | 0·046 | 0·730 | 0·223 | 0·851 | 0·002 | 0·017 |
| Seoni .. .. | 0·190 | 0·076 | 0·046 | 0·018 | 0·102 | 0·270 | 0·030 | 0·047 |
| Durg .. .. | 0·071 | 0·525 | 0·004 | 0·078 | 0·013 | 0·138 | 0·011 | 0·033 |
| Raipur .. .. | 0·056 | 0·230 | 0·005 | 0·064 | 0·011 | 0·172 | 0·017 | 0·048 |
| Bilaspur .. .. | 0·015 | 0·604 | 0·002 | 0·042 | 0·011 | 0·050 | 0·005 | 0·044 |
| Surguja .. .. | 0·015 | 0·027 | 0·002 | 0·006 | 0·010 | 0·068 | 0·005 | 0·009 |
| Raigarh .. .. | 0·032 | 0·264 | 0·006 | 0·010 | 0·001 | 0·030 | 0·005 | 0·037 |
| Bastar .. .. | 0·005 | 0·172 | 0·006 | 0·010 | 0·007 | 0·109 | 0·003 | 0·008 |
| Sehore .. .. | 0·042 | 0·130 | 0·006 | 0·288 | 0·334 | 1·026 | 0·069 | 0·094 |
| Raisen .. .. | 0·036 | 0·125 | 0·006 | 0·051 | 0·044 | 0·275 | 0·134 | 0·320 |
| Mahakoshal and Bhopal regions .. .. | 0·340 | 0·666 | 0·006 | 0·178 | 0·075 | 0·395 | 0·023 | 0·066 |

A look at the data given in Table V would convince that the larger percentage increases do not seem to have improved the supply intensities substantively (with the exception of oil engines in East Nimar, Sehore, Betul, Chhindwara, Hoshangabad and Balaghat districts). East Nimar, Jabalpur, Bilaspur, Durg, and Narsimhapur in the case of iron ploughs; East Nimar, Chhindwara, Betul and Narsimhapur in the case of electric pumps; Raisen, Sagar and Jabalpur in the case of tractors, have shown somewhat encouraging progress as compared to other districts.

The broad picture of changing importance of individual assets, as seen from Tables IV and V, may further be visualized from the percentage investment on individual implements and machinery to the total investment in subsequent years in the entire study area. The percentage investment figures are presented in Table VI.

TABLE VI—PERCENTAGE INVESTMENT ON INDIVIDUAL IMPLEMENTS AND MACHINERY TO THE TOTAL INVESTMENT ON IMPLEMENTS AND MACHINERY IN MAHAKOSHAL AND BHOPAL REGIONS

| Year | Carts | Tractors | Ploughs | | Sugarcane crushers | | Pumps | |
|---|---|---|---|---|---|---|---|---|
| | | | Wooden | Iron | Power | Bullocks | Diesel | Electric |
| 1955-56 .. | 75·36 | 3·19 | 16·95 | 0·15 | 0·04 | 1·89 | 2·34 | 0·08 |
| 1960-61 .. | 73·58 | 4·02 | 15·28 | 0·18 | 0·08 | 1·86 | 4·56 | 0·44 |
| 1963-64 .. | 70·72 | 5·36 | 14·74 | 0·18 | 0·11 | 1·84 | 5·81 | 1·24 |
| 1965-66 .. | 69·27 | 6·46 | 13·75 | 0·23 | 0·14 | 1·82 | 6·99 | 1·34 |
| 1967-68 .. | 64·90 | 7·09 | 12·58 | 0·39 | 0·42 | 1·68 | 9·46 | 3·48 |

It is self-evident from the table that the relative importance of carts has declined from 75 per cent in 1955-56 to nearly 65 per cent during 1967-68.

Again, wooden ploughs and bullock-drawn sugarcane crushers have also declined in importance from 17 per cent to 13 per cent and from 1.89 per cent to 1.68 per cent respectively during the same period. This leads us to the conclusion that more and more investment is being made on non-traditional implements like iron ploughs, tractors, etc.

---

# CAPITAL INVESTMENT IN AGRICULTURE — A STUDY IN REGIONAL VARIATIONS

A. G. PRASAD

*Agro-Economic Research Centre*
*Andhra University, Waltair*

## INTRODUCTION

Since the inception of planning, agriculture is given prime importance to make the country self-sufficient. Accordingly huge sums of money are pumped into this sector by the Government by way of major and minor irrigation projects and other allied and ancillary activities. In consonance with this, private individuals too are investing capital in agriculture to reap the advantages generated