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## Status of farm implements and machineries in different district of Amravati division in Vidarbha region

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### Abstract

Agricultural mechanization is the use and servicing of all types of agricultural tools, equipment, and machines. Farmers of India like their counterparts in other countries are interested to improve their income. The present study was conducted in Vidarbha region of Maharashtra for the period 2000-01 to 2015-16 which was divided into 4 (four) time stages i.e. 2000-01, 2005-06, 2010-11, 2015-16 from all 11 districts of the Vidarbha region. The district-wise secondary data on indicators of agricultural mechanization and productivity of crops will be collected from various publications. To study the status of farm implements and machineries at different points of times in different district of Vidarbha analyzed by using tabular analysis. It observed that the availability of farm implements and machineries in 2005-06 over base period concluded that that lowest change was indicated 101.44 per cent in the number of ploughs while that highest 2429.60 per cent in the number of rotavators. Whereas during 2010-11 and 2015-16 ranges between 202.88 per cent to 4859.20 per cent and 398.32 per cent to 37954.78 per cent respectively the growth of rotavators was highest followed by tractors, Harvesters Puddlers and threshers. It concludes that the availability of farm implements under the study have been over the period concluding that, the farmers are swinging over mechanization and that the significant change in farmers attitudes.

**Keywords:** Mechanization indicators, present status, tabular analysis, and vidarbha region

### Introduction

Agricultural mechanization is the use and servicing of all types of agricultural tools, equipment, and machines. Various types of agricultural operations performed on a farm seedbed preparation, cultivation, harvesting, transportation, silage cutting, feed grinding, threshing, winnowing and lifting of irrigation water, etc. Agricultural machinery is a general term used to describe tractors, combines, implements, machines and any other device more sophisticated than hand tools which are animal or mechanically powered. Agricultural equipment generally refers to stationary mechanical devices such as irrigation pump-set. Farm mechanization is very closely related to the shortage of human labor and industrial development in the country. Drudgery and physical exertion are typical of much Indian agriculture today. Farmers of India like their counterparts in other countries are interested to improve their income. Timeliness of operation, the precision of operation, improvement of the work environment, enhancement of safety, reduction of the drudgery of labor, reduction of loss of crops and food products, increased the productivity of land, increased economic return to farmers, improved dignity of farmers and progress and prosperity in rural areas. Increasing productivity by updating executive operations to gain more power, increasing the level of cultivated land, moving toward industrialization and strengthening the market for rural economic growth and ultimately improving the livelihoods of farmers are the goals of farm mechanization.

### Objective

To study the status of farm implements and machineries at different points of times in different district of Vidarbha.

### Methodology

The present study was conducted in Vidarbha region of Maharashtra for the period 2000-01 to

2015-16 which was divided into 4 (four) time stages i.e. 2000-01, 2005-06, 2010-11, 2015-16 from all 11 districts of the Vidarbha region. The district-wise secondary data on indicators of agricultural mechanization was collected from various publications.

### The following indicators will be selected purposely to study the farm mechanization

#### I. Indicators of farm mechanization

1. No. of ploughs / 100 hectare of net cultivated area
2. No. of disc harrows / 100 hectare net cultivated area
3. No. of rotavators / 100 hectare net cultivated area
4. No. of cultivators / 100 hectare net cultivated area
5. No. of puddlers / 100 hectare net cultivated area
6. No. of levelers/ 100 hectare net cultivated area
7. No. of sowing devices / 100 hectare net cultivated area
8. No. of sprayers/ 100 hectare net cultivated area
9. No. of electrical and diesel pumps / 100 hectare net cultivated area
10. No. of threshers / 100 hectare net cultivated area
11. No. of tractors / 100 hectare net cultivated area
12. No. of harvesters / 100 hectare net cultivated area

#### Analytical tools

Simple tabular analysis was used to study the status of farm implements and machineries at different points of times in different districts Vidarbha as compare to base year.

#### Results and Discussion

The study has been intentionally planed in Vidarbha region for the period 2000-01 to 2015-16 in all the 5 districts of Amravati division. Data on number of ploughs, number of disc harrow, number of rotavators, number of cultivators, number of puddlers, number of levelers, number of sowing device, number of sprayers, number of electrical and diesel pumps, number of threshers, number of tractors and number of harvesters has been recorded in various publications at four times stages 2000-01, 2005-06, 2010-11 and 2015-16. It was observed that the farm mechanization the developmental status of the districts played an important role in the productivity of selected crops for the study. The result of the different regression equation fitted was given below table 1 to 6.

Table 1 presents the number of implements and machinery in Amravati district during study period along with percentage change over the base year 2000-01. The figures presented in the table described that drastic changes in the availability of farm implements under the study have been over the concluding that, the farmers are swinging over mechanization. The percentage change 2005-06 over 2000-01 concluded that lowest change was recorded 151.85 per cent in the number of disc harrow while that highest 25668.18 per cent in the number of rotavators indicating that farmers on concentration on farm implements like tractors, harvesters, puddlers and rotavators. The identical picture has been recorded during the study period in 2010-11 and 2015-16. The rotavators recorded the highest increased in comparison with other implements. While the implements like ploughs and disc harrow, however the percentage change amongst the farm implements during 2010-11 ranges between 303.71 per cent to 51336.36 per cent. Whereas during 2015-16 ranges between 413.54 per cent to 359954.55 per cent the growth of rotavators was highest followed by harvesters, puddlers, tractors and threshers. Concluding that the significant change in farmers attitudes.

In table 2 indicated the farm implements and machineries increased the mechanical advantage as well as the reduce drudgery of human while performing the different agricultural operations. It revealed that the availability of farm implements and machineries increased over the study period. The percentage change in the availability of farm implements and machineries in 2005-06 over 2000-01 concluded that lowest change was recorded 113.40 per cent in the number of levellers while that highest 1403300.00 per cent in the number of rotavators indicating that increased due to timeliness operations and good quality of work. Numbers of harvesters, tractors and threshers increased during the study period in 2010-11 and 2015-16. The implements like plough, levelers and disc harrow lowest 226.80 per cent and rotavators, puddlers tractors and threshers highest 2806700.00 per cent change during 2010-11 that means the uses new technology by the farmers. Whereas during 2015-16 ranges between 531.23 per cent to 22454300.00 per cent the growth of rotavators was highest followed by puddlers, tractors, threshers and harvesters. Concluding that the improvement in technology, increasing labour wages, timely unavailability of labour, looking for labour saving devices, remove drudgery from farm operations, avoids stresses and hazards.

Table 3 presents the farm implements used generally in Washim district was rotavators, puddlers, tractors, threshers, ploughs, disc harrows, cultivators, levelers and sprayer. In this table number of levelers were very less 214.64 per cent while that highest 128000.00 per cent in the number of rotavators in 2005-06 over the 2000-01 observed. The availability and judicious use of farm power by the farmers. The demand for important agricultural equipment like tractors, puddlers, rotavators, harvesters, electrical/diesel pumps has shown an increasing trend during the study period in 2010-11 and 2015-16. Improved implements such as rotavators, puddlers and tractors are more efficient and that why they are being adopted by farmers. Further, the use of rotavators is also registering a higher growth due to their impact on the timeliness of farm operations and increase work output per unit time in comparison with other implements. While the implements like ploughs, cultivators and disc harrow however, the percentage change amongst the farm implements during 2010-11 ranges between 429.28 per cent to 255900.00 per cent. Whereas during 2015-16 ranges between 700.60 per cent to 1791900.00 per cent the growth of rotavators was highest followed by puddlers, tractors, threshers and harvesters. Over the last few years, there has been considerable progress in agriculture mechanization.

Table 4 observed the mechanical equipment for various farm operations like tillage, sowing, irrigation, plant protection and threshing etc. are generally being used by the farmers. The important agricultural equipment like tractors, harvesters, threshers, puddlers, rotavators power tillers, harvesters, electrical/diesel pump sets, has been increasing over the study period in in 2005-06 and 2010-11. The rotavators observed the highest growth in comparison with other implements. While the implements like plough, diesel pumps and disc harrow however the percentage change amongst the farm implements during 2005-06 ranges between 7.24 per cent to 54877.27 per cent. Whereas during 2010-11 ranges between 14.48 per cent to 109754.55 per cent the growth of rotavators was highest followed by harvesters, tractors, puddlers and threshers. The percentage change 2015-16 over 2000-01 concluded that lowest change was recorded 85.17 per cent in the number of levellers while that highest 768881.82 per cent

in the number of rotavators indicating that farmers on concentration on farm implements like tractors, harvesters, threshers, puddlers, and rotavators.

Table 5 observed the mechanization plays an essential role in agriculture and assures timely completion of farm operations as well as less expenditure per unit area. In Yavatmal district, changes in the availability of farm implements under the study. The percentage change 2005-06 over 2000-01 concluded that lowest change was recorded 7.51 per cent in the number of levellers while that highest 5813.64 per cent in the number of rotavators indicating that most of the farmers used power operated equipment for various farm operations. The observed figures have been recorded during the study period in 2010-11 and 2015-16. The rotavators recorded the highest increased in comparison with other implements. While the implements like plough and disc harrow however the percentage change amongst the farm implements during 2010-11 ranges between 15.01 per cent to 11627.27 per cent. Whereas during 2015-16 ranges between 318.78 per cent to 234409.09 per cent the growth of rotavators was highest followed by tractors, harvesters and threshers. Concluding

that the power operated equipment found significantly higher as compared to another farm equipment.

Table 6 presents the data presented in the table described that drastic changes in the availability of farm implements under the study have been over the concluding that, the farmers are swinging over mechanization in Amravati division. The percentage change 2005-06 over 2000-01 concluded that lowest change was recorded 75.42 per cent in the number of levelers while that highest 55141.14 per cent in the number of rotavators indicating that farmers on concentration on farm implements like rotavators, tractors, harvesters and threshers. The identical picture has been recorded during the study period in 2010-11 and 2015-16. The rotavators recorded the highest increased in comparison with other implements. While the implements like ploughs and disc harrow, however the percentage change amongst the farm implements during 2010-11 ranges between 150.85 per cent to 110282.28 per cent. Whereas during 2015-16 ranges between 360.34 per cent to 850550.63 per cent the growth of rotavators was highest followed by tractors, harvesters, threshers and puddlers. Concluding that the significant change in farmers attitudes.

**Table 1:** Status of farm implements and machineries at different points of times in Amravati district (number/00 ha)

| Sr. No. | Selected Indicators         | 2000-01 | 2005-06         | 2010-11          | 2015-16           |
|---------|-----------------------------|---------|-----------------|------------------|-------------------|
| 1       | Ploughs                     | 55834   | 150484 (169.52) | 245134 (339.04)  | 286729 (413.54)   |
| 2       | Disc harrows                | 7146    | 17998 (151.85)  | 28849 (303.71)   | 48893 (584.20)    |
| 3       | Rotavators                  | 11      | 2835 (25668.18) | 5658 (51336.36)  | 39606 (359954.55) |
| 4       | Cultivators                 | 17086   | 82379 (382.14)  | 147672 (764.29)  | 160422 (838.91)   |
| 5       | Puddlers                    | 36      | 6098 (16838.89) | 12160 (33677.78) | 14592 (40433.33)  |
| 6       | Levelers                    | 12038   | 44987 (273.71)  | 77936 (547.42)   | 122111 (914.38)   |
| 7       | Sowing devices              | 33497   | 145519 (334.42) | 257541 (668.85)  | 516495 (1441.91)  |
| 8       | Sprayers                    | 35204   | 156425 (344.34) | 277645 (688.67)  | 797608 (2165.67)  |
| 9       | Electrical and diesel pumps | 31321   | 84159 (168.70)  | 136997 (337.40)  | 594468 (1797.99)  |
| 10      | Threshers                   | 2665    | 38039 (1327.35) | 73413 (2654.71)  | 155473 (5733.88)  |
| 11      | Tractors                    | 2256    | 59780 (2549.80) | 117303 (5099.60) | 821121 (36297.21) |
| 12      | Harvesters                  | 38      | 3409 (8869.74)  | 6779 (17739.47)  | 25707 (67550.00)  |

Figures in parenthesis show the percentage to base period (2000-01)

**Table 2:** Status of farm implements and machineries at different points of times in Akola district (number/00 ha)

| Sr. No. | Selected Indicators         | 2000-01 | 2005-06            | 2010-11            | 2015-16              |
|---------|-----------------------------|---------|--------------------|--------------------|----------------------|
| 1       | Ploughs                     | 33710   | 118400 (251.23)    | 203091 (502.47)    | 410514 (1117.78)     |
| 2       | Disc harrows                | 2083    | 16919 (712.24)     | 31756 (1424.53)    | 85753 (4016.80)      |
| 3       | Rotavators                  | 1       | 14034 (1403300.00) | 28068 (2806700.00) | 224544 (22454300.00) |
| 4       | Cultivators                 | 5438    | 49064 (802.24)     | 92691 (1604.51)    | 105463 (1839.37)     |
| 5       | Puddlers                    | 21      | 4032 (19100.00)    | 8044 (38204.76)    | 11262 (53528.57)     |
| 6       | Levelers                    | 14331   | 30582 (113.40)     | 46834 (226.80)     | 90462 (531.23)       |
| 7       | Sowing devices              | 29034   | 93486 (221.99)     | 157938 (443.98)    | 379005 (1205.38)     |
| 8       | Sprayers                    | 25379   | 124799 (391.74)    | 224220 (783.49)    | 642739 (2432.56)     |
| 9       | Electrical and diesel pumps | 12537   | 43068 (243.53)     | 73600 (487.06)     | 265890 (2020.84)     |
| 10      | Threshers                   | 1031    | 28888 (2701.94)    | 56746 (5403.98)    | 79170 (7578.95)      |
| 11      | Tractors                    | 1369    | 30225 (2107.82)    | 59082 (4215.70)    | 354492 (25794.23)    |
| 12      | Harvesters                  | 537     | 3653 (580.26)      | 6770 (1160.71)     | 17693 (3194.79)      |

Figures in parenthesis show the percentage to base period (2000-01)

**Table 3:** Status of farm implements and machineries at different points of times in Washim district (number/00 ha)

| Sr. No. | Selected Indicators         | 2000-01 | 2005-06          | 2010-11          | 2015-16            |
|---------|-----------------------------|---------|------------------|------------------|--------------------|
| 1       | Ploughs                     | 16856   | 99493 (490.25)   | 182129 (980.50)  | 315280 (1770.43)   |
| 2       | Disc harrows                | 1041    | 13667 (1212.87)  | 26292 (2425.65)  | 56760 (5352.45)    |
| 3       | Rotavators                  | 1       | 1281 (128000.00) | 2560 (255900.00) | 17920 (1791900.00) |
| 4       | Cultivators                 | 2719    | 19652 (622.77)   | 36584 (1245.49)  | 42767 (1472.89)    |
| 5       | Puddlers                    | 11      | 5255 (47672.73)  | 10499 (95345.45) | 15749 (143072.73)  |
| 6       | Levelers                    | 7166    | 22547 (214.64)   | 37928 (429.28)   | 57371 (700.60)     |
| 7       | Sowing devices              | 14517   | 79147 (445.20)   | 143777 (890.40)  | 370872 (2454.74)   |
| 8       | Sprayers                    | 12690   | 77182 (508.21)   | 141673 (1016.41) | 410082 (3131.54)   |
| 9       | Electrical and diesel pumps | 6268    | 37417 (496.95)   | 68566 (993.91)   | 190682 (2942.15)   |

|    |            |     |                 |                 |                   |
|----|------------|-----|-----------------|-----------------|-------------------|
| 10 | Threshers  | 939 | 27993 (2881.15) | 55046 (5762.19) | 87045 (9169.97)   |
| 11 | Tractors   | 685 | 31522 (4501.75) | 62358 (9003.36) | 311790 (45416.79) |
| 12 | Harvesters | 269 | 5255 (1853.53)  | 10241 (3707.06) | 14210 (5182.53)   |

Figures in parenthesis show the percentage to base period (2000-01)

**Table 4:** Status of farm implements and machineries at different points of times in Buldhana district (number/00 ha)

| Sr. No. | Selected Indicators         | 2000-01 | 2005-06          | 2010-11           | 2015-16            |
|---------|-----------------------------|---------|------------------|-------------------|--------------------|
| 1       | Ploughs                     | 139374  | 289005 (107.36)  | 438637 (214.72)   | 718331 (415.40)    |
| 2       | Disc harrows                | 9033    | 44298 (390.40)   | 79563 (780.80)    | 154570 (1611.17)   |
| 3       | Rotavators                  | 44      | 24190 (54877.27) | 48336 (109754.55) | 338352 (768881.82) |
| 4       | Cultivators                 | 7141    | 66210 (827.18)   | 125279 (1654.36)  | 215908 (2923.50)   |
| 5       | Puddlers                    | 201     | 7120 (3442.29)   | 14040 (6885.07)   | 15444 (7583.58)    |
| 6       | Levelers                    | 39205   | 42043 (7.24)     | 44881 (14.48)     | 72594 (85.17)      |
| 7       | Sowing devices              | 66174   | 150617 (127.61)  | 235060 (255.22)   | 686303 (937.12)    |
| 8       | Sprayers                    | 48896   | 190483 (289.57)  | 332070 (579.14)   | 935519 (1813.28)   |
| 9       | Electrical and diesel pumps | 46208   | 105129 (127.51)  | 164050 (255.03)   | 683135 (1378.39)   |
| 10      | Threshers                   | 4145    | 71046 (1614.02)  | 137947 (3228.03)  | 205122 (4848.66)   |
| 11      | Tractors                    | 2657    | 43894 (1552.01)  | 85132 (3104.06)   | 425660 (15920.32)  |
| 12      | Harvesters                  | 266     | 8428 (3068.42)   | 16591 (6137.22)   | 58381 (21847.74)   |

Figures in parenthesis show the percentage to base period (2000-01)

**Table 5:** Status of farm implements and machineries at different points of times in Yavatmal district (number/00 ha)

| Sr. No. | Selected Indicators         | 2000-01 | 2005-06         | 2010-11         | 2015-16           |
|---------|-----------------------------|---------|-----------------|-----------------|-------------------|
| 1       | Ploughs                     | 110029  | 123343 (12.10)  | 136657 (24.20)  | 479333 (335.64)   |
| 2       | Disc harrows                | 19195   | 31085 (61.94)   | 42976 (123.8)   | 63072 (228.59)    |
| 3       | Rotavators                  | 22      | 1301 (5813.64)  | 2580 (11627.27) | 51592 (234409.09) |
| 4       | Cultivators                 | 13747   | 33519 (143.83)  | 53291 (287.66)  | 162176 (1079.72)  |
| 5       | Puddlers                    | 3729    | 5337 (43.12)    | 6945 (86.24)    | 26043 (598.39)    |
| 6       | Levelers                    | 18489   | 19877 (7.51)    | 21265 (15.01)   | 77428 (318.78)    |
| 7       | Sowing devices              | 40295   | 55741 (38.33)   | 71187 (76.66)   | 273882 (579.69)   |
| 8       | Sprayers                    | 63027   | 85869 (36.24)   | 108712 (72.48)  | 918379 (1357.12)  |
| 9       | Electrical and diesel pumps | 22071   | 38850 (76.02)   | 55630 (152.05)  | 640448 (2801.76)  |
| 10      | Threshers                   | 3094    | 17578 (468.13)  | 32062 (936.26)  | 68832 (2124.69)   |
| 11      | Tractors                    | 865     | 18960 (2091.91) | 37055 (4183.82) | 370548 (42737.92) |
| 12      | Harvesters                  | 21      | 188 (795.24)    | 355 (1590.48)   | 1120 (5233.33)    |

Figures in parenthesis show the percentage to base period (2000-01)

**Table 6:** Status of farm implements and machineries at different points of times in Amravati division (number/00 ha)

| Sr. No. | Selected Indicators         | 2000-01 | 2005-06          | 2010-11           | 2015-16            |
|---------|-----------------------------|---------|------------------|-------------------|--------------------|
| 1       | Ploughs                     | 355803  | 780725 (119.43)  | 1205648 (238.85)  | 2210187 (521.18)   |
| 2       | Disc harrows                | 38498   | 123967 (222.01)  | 209436 (444.02)   | 409048 (962.52)    |
| 3       | Rotavators                  | 79      | 43641 (55141.14) | 87202 (110282.28) | 672014 (850550.63) |
| 4       | Cultivators                 | 46131   | 250824 (443.72)  | 455517 (887.44)   | 686736 (1388.66)   |
| 5       | Puddlers                    | 3998    | 27842 (596.40)   | 51688 (1192.85)   | 83090 (1978.29)    |
| 6       | Levelers                    | 91229   | 160036 (75.42)   | 228844 (150.85)   | 419966 (360.34)    |
| 7       | Sowing devices              | 183517  | 524510 (185.81)  | 865503 (371.62)   | 2226557 (1113.27)  |
| 8       | Sprayers                    | 185196  | 634758 (242.75)  | 1084320 (485.50)  | 3704327 (1900.22)  |
| 9       | Electrical and diesel pumps | 118405  | 308623 (160.65)  | 498843 (321.30)   | 2374623 (1905.51)  |
| 10      | Threshers                   | 11874   | 183544 (1445.76) | 355214 (2891.53)  | 595642 (4916.36)   |
| 11      | Tractors                    | 7832    | 184381 (2254.19) | 360930 (4508.40)  | 2283611 (29057.44) |
| 12      | Harvesters                  | 1131    | 20933 (1750.80)  | 40736 (3501.77)   | 117111 (10254.64)  |

Figures in parenthesis show the percentage to base period (2000-01)

## Conclusions

It concluded that the improvement in technology, increasing labour wages, timely unavailability of labour, looking for labour saving devices, remove drudgery from farm operations, avoids stresses and hazards. It observed that the power operated equipment found significantly higher as compared to another farm equipment. Over the last few years, there has been considerable progress in agriculture mechanization.

## References

1. Dixit J, Sharma S, Ali M. Present status, potential and future needs for mechanization of agricultural operations

in Jammu and Kashmir state of India. *Agric Eng. Int. CIGR Journal* 2014;16(3):87-96.

2. Kumar Sampath M. A study on the agricultural mechanization in Karimnagar district of Andhra Pradesh. M. Sc. Thesis Dept. of Agril. Extn., College of Agriculture, Rajendranagar, Acharya N.G. Ranga Agricultural University, Hyderabad 2014.
3. Kumar Rakesh, Ashok Tripathi. Status of farm mechanization of different agro-climatic zones in Uttar Pradesh. *Int. J of Agril. Engg* 2018;11(1):180-183.
4. Kumar Shaukendra, Surendra Pal, Uday Veer Singh, Lawrence AKA. To study the status of tractor drawn farm implements used in the Bulandshahr district. *J of*

- Pharmacognosy and Phytochemistry 2018;7(4):279-281.
5. Lohan Shiv Kumar, Mahesh Kumar Narang, Gursahib Singh Manes, Nikhil Grover. Farm power availability for sustainable agriculture development in Punjab state of India. *Agric Eng Int. CIGR J* 2015;17(3):196-207.
  6. Rahman H, Karuppaiyan R, Kalita H. Status of agricultural mechanization in Sikkim. Conference on agricultural mechanization technologies for north east India held at ICAR research complex for NEH region, Umiam, Meghalaya during October 2008, 22-24.
  7. Raina Sunny, Hemant Dadhich, Anil Kumar, Brinder Singh, Jai Kumar. Status, scope and constraints of farm mechanization in Jammu and Kashmir State of India. *Int. J Curr. Micro. App. Sci* 2018;7(3):1279-1286.
  8. Shahare PU. Agricultural Mechanization in Konkan Region of Maharashtra. Dr. B.S. Konkan Krishi Vidyapeeth Dapoli, Dist: Ratnagiri 2012, 36(2).
  9. Shambhu VB, Ram RB. Status of farm mechanization in Nalanda District of Bihar. *Agril. Mech in Asia, Africa and Latin America* 2007;38(1):18-22.
  10. Singh Joginder. Scope, progress and constraints of farm mechanization in India. *Status of Farm Mechanization in India*, IARI, March 2006.
  11. Singh RS, Surendra Singh, Singh SP. farm power and machinery availability on Indian farms. *Agril. Engg*, IARI, New Delhi 2015;39(1):45-56.
  12. Srivastava NSL. Farm power sources, their availability and future requirements to sustain agricultural production. *Technical Bulletin. Status of farm mechanization in India*. IARI, New Delhi 2006, 57-68.
  13. Tewari VK, Ashok Kumar A, Satya Prakash Kumar, Brajesh Nare. Farm mechanization status of West Bengal in India. *Basic Research Journal of Agricultural Science and Review* 2012;1(6):139-146.