Agro Economist - An International Journal
Citation: AE: **8**(02): 145-151, December 2021
DOI: 10.30954/2394-8159.02.2021.8

AAEBM
ASSOCIATION OF AGRICULTURAL ECONOMICS & AGRI-BUSINESS MANAGEMENT

A Study on Structural Changes in Operational Holding in India: An Analytical Approach

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Received: 25-08-2021 **Revised:** 24-11-2021 **Accepted:** 03-12-2021

ABSTRACT

There has been a lot of changes in farming structure in the country between 1970-71 to 2015-16. The marginal, small, semi-medium, medium and large size farmers accounted for about 51%, 18%, 15%, 11% and 4% in the total number of farmers in 1970-71 respectively. While the same group of farmers contributed to nearly 68%, 18%, 10%, 4% and less than one per cent in total number, respectively during 2015-16. The size of operational area has also significantly changed to 24%, 23%, 24%, 20% and 8% in 2015-16 from 9%, 12%, 19%, 30%, and 31% in 1970-71 in marginal, small, semi-medium, medium and large farmers, respectively. All India average size of operational area has declined from 2.28 hectare to 1.06 hectare during this period. The magnitude of the decline was more pronounced in medium and large size farmers. The rate of annual increase in number was high (2.3%) in marginal farmers followed by small (1.40%) and lowest (0.60%) in semi-medium from 1970-71 to 2015-16, respectively. While negative annual growth rate was high (-3.0%) in large size groups followed by medium (-1.0%) during the same period. In the case of area, rate of annual growth was further high (2.10%) in marginal holding and low (0.50%) in semi medium group in the study period. The negative annual growth rate was further much more in medium and large size operational area in the country from 1970-71 to 2015-16 respectively. It was also found that there is no significant difference in cropping intensity (C.I.) on different size of operational holding in the states and union territories in the country. The study suggests that there is an urgent need to focus on irrigation facilities on farmers' field to minimize the effect of agriculture holding.

Keywords: Operational area, cropping intensity, farm size, gross irrigated area

Indian agriculture is a pivotal sector of the country's economy with a bulk of population engaged in crop production and allied field. The country has 1.30 billion people (2019) or nearly 18% of global population which lives on about 2.4% land and 5% water resources of the world. Despite being highly populous, India has made remarkable strides in agricultural production since independence contrary to popular perception, India's agriculture is a grant success story. With 11% of total global agriculture, India's rank second in the world agriculture production as the leading producer of several commodities including food grains, cotton, cane, horticultural crops, dairy, fisheries and spices.

India's population was just 376.32 million in 1950 but it is now just 1.3 billion in 2019. The growing

How to cite this article: Singh, R.P., Prakash, J. and Singh, A.K. (2021). A Study on Structural Changes in Operational Holding in India: An Analytical Approach. *Agro Economist - An International Journal*, **08**(02): 145-151.

Source of Support: None; **Conflict of Interest:** None

population poses a challenge to food and nutritional securities when there is a pressure on land due to urbanization, improved standard of living, changed food habits etc. generating great demand for diversified agricultural commodities. The challenges are further exorbitant by decline soil health, low nutritional content, occurrence of new biotic stress, and frequent drought and flood due to climate change and decline in average size of operational area. Just now average size of operational area is 1.11 hectare (2015-16) from 2.27 hectare in 1970-71 in the country. The reduction in operational size of farm has direct impact on farmer's income and employment and further leads to rural migration. In this study an attempt has been made to examine rate of annual changes in operational area in various categories of farmers that changes structure of farming sector. Besides, further attempt has been made to examine impact of average size of holding on cropping intensity on the farm. The hypothesis of this study is that there is significant difference in cropping intensity of large average size of holding (2.0 hectare and above) in comparison low farm size (<1.00 hectare and 1.00 to 2.00 hectare).

MATERIALS AND METHODS

The basis of data on operational land and number of farmers under different category farm holding on different period of time, cropping intensity of different states and their average size of farm holding have been collected from various issues of Economic Survey, Data book on agriculture, Agriculture Census book 2015-16 etc. The compound growth rate on decades for different categories of farm land and farmers have been estimated using the following type of Exponential Model as adopted by many economists.

$$P_t = P_0\left(1+\frac{r}{100}\right)^t$$

Where, P_t = Operational area and number of farmers in different categories of farms i.e. marginal, small, semi medium, medium, and large farmers in the '*t*' time period; P_0 = Operational area and number of farmers in different categories of farms i.e. marginal, small, semi-medium, medium, and large farmers in the base year; *r* = Compound Growth Rate (CGR); *t* = Time period.

The growth rate over the year is estimated for every category of farmers except in 2010-11 to 2015-16. The overall growth rate indicates from 1970-71 to 2015-16 respectively. The relationship between average size of holding and cropping intensity of states and union territories is also examined to see whether cropping intensity on greater than 2.00-hectare average size of holding of states is high in comparison to less than one hectare and one-to-two-hectare average size of holding of states. For this analysis 't' test was used. The states and union territories were grouped under three categories.

1. Category A (Marginal) having less than one hectare.
2. Category B (Small) having one to two hectares.
3. Category C (Large) having two and above hectares.

RESULTS AND DISCUSSION

The number of farmers in the country increases from 1970-71 to 2015-16 (Table 1). The category wise analysis shows that the number of marginal farmers increased near about 3.0 times in the same period.

The similar condition was also observed in case of small farmers, showing increasing trend throughout the period. The number of farmers increased near about two times in 2015-16 over the base year 1970-71. In case of semi-medium category, the positive trend was observed from 1970-71 to 2000-01, while constant trend observed from 2000-01 to 2015-16. In case of medium farmers, decreasing trend was found except in ten year period of 1980 to 1990.

The overall total strength of all categories of farmers was around 146200 thousand crores during 2015-16. The share of marginal farmers, small farmers, semi-medium farmers, medium farmers and large farmers was 68.47%, 17.63%, 9.55%, 3.80%, and 0.55% respectively.

Operational area

There has been a marginal reduction in total operational area in the country from 1970-71 to 2015-16, around 3.72 per cent (Table 2). The category wise analysis further revealed that operational area in marginal group of the farmers has shown increasing

Table 1: Categories of farmers in the country (Figures in thousand)

Category	1970-71	1980-81	1990-91	2000-01*	2010-11	2015-16	Remarks
Marginal (< 1 ha)	36200 (51.0)	50122 (56.4)	63399 (59.4)	75408 (67.9)	92806 (67.0)	100098 (68.47)	Increasing
Small (1-2 ha)	13432 (18.9)	16072 (18.1)	20092 (18.8)	22695 (18.9)	24779 (18.0)	25772 (17.63)	Increasing
Semi-medium (2-4 ha)	10681 (15.0)	12455 (14.0)	13923 (13.1)	14021 (11.7)	13869 (10.0)	13963 (9.55)	Increasing
Medium (4-10 ha)	7932 (13.9)	8063 (9.1)	7580 (7.10)	6577 (5.50)	5877 (4.2)	5538 (3.8)	Decreasing
Large (> 10 ha)	2766 (3.9)	2166 (2.4)	1684 (1.6)	1230 (1.0)	973 (0.8)	818 (0.55)	Decreasing
Total	**71011 (100)**	**88883 (100)**	**106637 (100)**	**119931 (100)**	**138348 (100)**	**146190 (100)**	**Increasing**

Sources: Agricultural Census 2015-16.

Figures in parenthesis indicate percentage; *2000-01 data excluded Jharkhand state; Figures are rounded off.

Table 2: Operational area in different categories of farmers in the country ('000 hectares)

Category	1970-71	1980-81	1990-91	2000-01*	2010-11	2015-16	Remarks
Marginal (< 1 ha)	14599 (9.0)	19735 (12.1)	24800 (15.0)	29814 (18.7)	35908 (22.3)	37873 (24.23)	Increasing
Small (1-2 ha)	19282 (11.9)	23169 (14.1)	28807 (17.4)	32139 (20.1)	35244 (22.1)	36098 (23.1)	Increasing
Semi-medium (2-4 ha)	29999 (18.5)	34645 (21.2)	38375 (23.2)	38183 (24.0)	37705 (23.7)	37535 (24.02)	Increasing
Medium (4-10 ha)	48234 (29.7)	48543 (29.6)	44752 (27.1)	38217 (24.0)	33827 (21.2)	31665 (20.25)	Decreasing
Large (> 10 ha)	50064 (30.9)	37705 (23.0)	28659 (17.3)	21072 (13.2)	16907 (10.6)	13106 (8.4)	Decreasing
Total	162318 (100)	163797 (100)	165507 (100)	159436 (100)	159592 (100)	156277 (100)	Increasing and decreasing

Sources: Agricultural Census 2015-16

Figures in parenthesis indicate percentage; *2000-01 data excluded Jharkhand state; Figures are rounded off.

throughout the period (from 9.04% to 24.23%). In respect to small farmers the same trend was observed during the period. The share of this group increased from about 12.0% to 23.0% between the period of 45 years. In case of semi-medium farmers negative trend was found though out the period. Its share reduced from 29.70% in 1970-71 to 20.25% in 2015-16 in the country. The same trend (negative trend) was also observed in case of large farmers. The share of operational area in total operation has reduced to about 8.5% in 2015-16 from about 31% in 1970-71 in the country. The total operational area was about 156300 thousand crore hectares in 2015-16 against 162400 crore hectares in 1970-71 in the country. The marginal reduction in this may be due to use of area in farm building, expansion of urbanization and other infrastructure developed in the country. Th overall share of marginal, small, semi-medium, medium, and large farmers in total operational area was about 24.25%, 23.0%, 24.0%, 20.25% and 8.50% respectively.

Average size of operational holding

There is a substantial decline in operational size of farm holding during study period (1970-71 to 2015-16) in the country. The main reason for this situation is increase of number of farmers which lead to break up joint family and division of operational land or parental land. The category wise analysis further indicates that average size of marginal farmer remains unchanged during 45 years in the country. This is mainly because of increase in number of farmers accompanied with increase in operational area. Similarly, in case of small farmers average size of holding remains unchanged except in 2015-16 (Table 3). The same reason as mentioned in marginal farmers' case. Against this, average size of operational holding in case of semi medium farmers has continuously declined throughout the period (from 2.81 hectare to 2.68 hectare). The similar trend was also obtained in medium farmers and large farmers in the country. The average size reduced from 6.08 hectare in 1970-71 to 5.71 hectare

in 2015-16 in case of medium farmers and from 18.0 hectare to 16.02 hectare of large farmers during same period, respectively. The reason for decline in average size of holding in three categories is due to transfer of operational area in the marginal and small farmers groups. The average size of farm of respective category was 0.38-hectare, 1.40-hectare, 2.68-hectare, 5.71 hectare, and 16.02 hectare in the year 2015-16.

Table 3: Average size of operational farm holding in different categories in the country (in hectares)

Size group	1970-71	1980-81	1990-91	2000-01*	2010-11	2015-16
Marginal (< 1 ha)	0.43	0.39	0.36	0.40	0.39	0.38
Small (1-2 ha)	1.44	1.44	1.43	1.42	1.42	1.40
Semi-medium (2-4 ha)	2.81	2.78	2.76	2.72	2.72	2.68
Medium (4-10 ha)	6.08	6.02	5.00	5.21	5.76	5.71
Large (> 10 ha)	18.10	17.41	17.33	17.12	17.38	16.02
Average	2.28	1.84	1.65	1.33	1.15	1.06

Sources: Agricultural Census 2015-16.

Figures in parenthesis indicate percentage; *2000-01 data excluded Jharkhand state; Figures are rounded off.

Growth rate of number of farmers under different categories

The overall growth in total number of farmers from 1970-71 to 2015-16 was 1.60 per cent as annual compound rate in the country (Table 4). The highest growth rate was found in between 1970-80 (2.27%) and lowest during 2010-15 (1.10%). The overall figures also revealed that number of farmers increased more than one per cent as compound annual rate in the country in all decades of periods. The category wise analysis further explained that the rate of growth in number of farmers in marginal category was highest in all decades than that of other categories of farmers during same decades. The rate of increase was 2.20 per cent from 1970-71 to 2015-16 in the country. The highest rate of increase was during 1970-80 (3.30%) followed by 2.37% from 1980-90 and minimum in between 2010-15 (1.50%). The rate of increase in small group of farmers was overall 1.40% per annum during 1970-71 to 2015-16 in the country. The highest rate of increase in strength of this group was found during 1980-90 (2.25%) per annum followed by 1.81% during 1970-80 and the lowest (0.80%) per year during 2000-10, respectively. In case of semi-medium group an average annual compound rate of growth was found to be about 0.60% from 1970-71 to 2015-16. The maximum rate of increase during 1970-71 to 1980-81 (1.54%) followed by 1980-81 to 1990-91 (1.12%) and negative rate in number was found between 2000-01 to 2010-11 (-0.10%) in the country. Contrary to this, negative growth rate was observed in case of medium and large categories of farmers. The overall negative growth was nearly 1.00 per cent annum from 1970-71 to 2015-16 and decade analysis further shows that except 1970-80 period in all decade's negative growth rate was observed. Similarly in case of large farmer group, negative growth rate obtained throughout the period. The overall rate of decline in number was -3.00 per cent per annum during 1970-71 to 2015-16. The decline rate per year was more than 2.00% in the country. This may be due to break up of large and medium farmers in marginal and small farmers group.

Table 4: Growth rate in number of farmers under different categories (in percentage)

Size group	1970-80	1980-90	1990-00	2000-10	2010-15	1970-71 to 2015-16
Marginal (< 1 ha)	3.30	2.37	1.75	2.10	1.50	2.2
Small (1-2 ha)	1.81	2.25	1.22	0.80	0.70	1.40
Semi-medium (2-4 ha)	1.54	1.12	0.07	-0.10	0.10	0.60
Medium (4-10 ha)	0.16	-0.62	-1.41	-1.12	-1.20	-1.00
Large (> 10 ha)	-2.42	-2.67	-3.00	-2.24	-0.35	-3.00
Overall	**2.27**	1.83	1.18	1.14	1.10	1.60

Sources: Agricultural Census 2015-16; Figures are rounded off.

Growth rate of area under different category of farmers

The overall growth rate in total operational area has declined at an annual compound rate of -0.10 per cent from 1970-71 to 2015-16 in the country (Table 5).

Table 5: Growth rate area under different categories of farmers (in percentage)

Size group	1970-80	1980-90	1990-00	2000-10	2010-15	1970-71 to 2015-16
Marginal (< 1 ha)	3.06	2.34	1.81	1.87	1.10	2.10
Small (1-2 ha)	1.85	2.20	1.09	0.92	0.50	1.40
Semi-medium (2-4 ha)	1.45	1.02	-0.50	-0.13	-0.20	0.50
Medium (4-10 ha)	0.06	-0.81	-1.57	-1.22	-1.30	-1.00
Large (> 10 ha)	-2.80	-2.11	-3.03	-2.18	-5.00	-3.00
All categories	0.09	0.10	-0.38	0.01	-2.0	-0.10

Sources: Agricultural Census 2015-16; Figures are rounded off.

The negative rate in area was started since 1990-91 in the country. This may be probably due to liberalization in economic policy in the country that help many developments scheme required land for structural development and also urbanization etc. The category wise analysis further revealed that average growth rate in area under marginal group was more than 2.0% per annum from 1970-2015. It was also found from the study the rate of increase in area was highest during 1970-80 after that it increased but magnitude of increase or rate of growth became lesser and lesser over decades except 2000-2010, respectively. In case of small farmers, average annual growth rate was 1.40% from 1970-71 to 2015-16. The magnitude of positive growth rate became lesser and lesser over decade except between 1980-90. Under semi medium group positive and negative growth rate was observed. The positive growth rate was 1.45% and 1.02% during 1970-80 and 1980-90, respectively. Since 1990-91 the negative growth rate was started over decades. The average growth rate during 1970-2015 was around 0.50% per annum. In case of medium group of farmers, negative growth rate was started since 1980-81 in the country. The rate of declining in area ranged from -0.81 % to -1.30% per cent respectively from 1980-81 to 2015-16. The overall annual growth rate was about -1.0% during 1970-71 to 2015-16. From the study it is clearly seen that about 3.00% per annum reducing under this category of farmers in the country. The reason in reduction in operational area of medium and large farmers is mainly due to shifting of area under marginal and small farmers particularly and some extent in semi-medium group. The shifting further leads to marginalization of holding size that may affect mechanization process.

Cropping intensity and size of holding

The states and Union Territories are classified under three groups on the basis of average land holding and examined in terms of cropping intensity. Under group 'A', average size of holding is <1.0 hectare, under group 'B' 1.0 to 2.0 hectare and group 'C' 2.0 hectare and above (Table 6). All together 36 states and union territories in 2015-16 in the country as reported in agricultural census 2015-16 for agricultural purposes. There was 14 states and Union Territories in which average size of holding was less than one hectare. Similarly, 16 states and union territories in which average size of farm holding varies between 1.0 hectare to 2.0 hectare and under third group 6 states in which average size of agricultural holding varies between 2.0 hectare and above.

Under group 'A' (marginal holding) the average holding size is 0.64 hectare which varies from 0.20 hectare to 0.95 hectare (table no. 6) out of 0.64-hectare average operational area 0.28-hectare gross irrigated area which was about 42 per cent, respectively. The average cropping intensity was 145% which ranged from 107 % to 190% respectively. Similarly, under group 'B' (small holding) the average operational holding size was 1.32 hectare in which minimum size was 1.0 hectare and maximum 1.85 hectare, respectively. The gross irrigated area was 0.36 hectare which was only 27% of total gross cropped area. The average cropping intensity on this group was 136 %. Under group 'C' (large holding) the average size of operational holding was 3.05 hectare which varies from 2.20 hectare to 4.85 hectare,

Table 6: Average operational area, gross irrigated area, and cropping intensity (2015-16)

Group A (less than 1 hectare)	Average Size (hectare)	G.I.A.	C.I. (%)	Group B (1-2 hectare)	Average Size (hectare)	G.I.A.	C.I. (%)	Group C (2-5 hectare)	Average Size (hectare)	G.I.A.	C.I. (%)
Andhra Pradesh	0.96	0.44	121	Assam	1.08	0.11	145	Arunachal Pradesh	2.72	0.52	133
Bihar	0.40	0.28	146	Chhattisgarh	1.24	0.38	121	Goa	2.20	0.55	121
Himachal Pradesh	0.95	0.21	169	Delhi	1.38	0.88	267	Haryana	2.22	2.04	185
Jammu and Kashmir	0.60	0.27	154	Gujarat	1.85	0.96	112	Nagaland	4.85	1.12	197
Kerala	0.20	0.04	130	Jharkhand	1.10	0.14	131	Punjab	3.62	3.62	190
Odisha	0.95	0.29	114	Karnataka	1.36	0.42	157	Rajasthan	2.72	1.14	139
Tamil Nadu	0.75	0.44	117	Madhya Pradesh	1.57	0.66	157				
Tripura	0.50	0.12	190	Maharashtra	1.34	0.27	137				
Uttar Pradesh	0.73	0.58	159	Manipur	1.45	0.25	100				
Daman and Diu	0.37	0.01	103	Meghalaya	1.30	0.55	123				
Lakshadweep	0.30	Nil	107	Mizoram	1.24	0.20	130				
Pondicherry	0.62	0.51	171	Sikkim	1.26	0.20	177		–		
West Bengal	0.75	0.48	189	Telangana	1.00	0.41	117				
Uttara Khand	0.85	0.43	155	Andaman and Nicobaric Island	1.75	0.02	127				
	–			Dadar and Nagar Hawley	1.33	0.44	103				
				Chandigarh	1.00	0.62	111				
Mean	0.64	0.28	145	Mean	1.32	0.36	136	Mean	1.32	0.36	136

Source: Agricultural Census 2015-16; Figures are rounded off.

respectively. The average cropping intensity was 161 per cent and highest was 193 per cent and lowest was 121%. In this group of the total cropped area, gross irrigated area was about 50%, but in these states namely Haryana, and Punjab states almost all cropped area under irrigation facility. Although table indicates that cropping intensity is marginally high on large size of operational holding as compared to small and marginal holding but it is not statistically significant different on three categories of average size of operational holding of states and union territories hence formulated hypothesis is rejected and proved that cropping intensity does not depend on only size of holding rather other factors like irrigation facility, rainfall and other climatic factors. But marginalization of average size of agricultural holding would be certainly affect use of improved farm machinery and also create management problem and further hamper scope of marketing in the country.

CONCLUSION

It is concluded that there has been significant increase in number of marginal, small, and semi-medium farmers in the country from 1970-71 to 2015-16. The increase in number is more obvious in marginal farmers (177%) followed small (92%) and semi-medium (31%), respectively. Medium and large farmers have decreased significantly. Like number of farmers, operational area has been shifted 159%, 87%, and 25% in favour of marginal, small, and semi-medium categories farmers against this nearly 34% and 73% declined in medium and large farmers group between 1970-71 to 2015-16 respectively. The average size of holding remains unchanged or marginally decline in marginal, small, and semi-medium farmers holding. The rate of annual growth was high in marginal followed by small and semi-medium farmers in this period. The negative annual growth rate was observed in medium and large group. The annual growth in area of marginal, small

and semi-medium was 2.10%, 1.40%, and 0.50%, respectively. The negative growth rate in operational area was -1.00% and -3.00% per annum in medium and large farmers. There was no significant positive relationship between higher average size holdings and cropping intensity in the country. Therefore, marginal size holding accompanied irrigation facility would be able to increase more cropping intensity on the farm brining more area under multiple crops in a year than large farmers having no irrigation. It is great need to facilitate farmers for increasing area under irrigation.

REFERENCES

Agriculture Census. 2019. Agriculture Census, 2015-16. All India Report on Number and Area of Operational Holdings, Government of India, New Delhi, published by Agriculture Census Division Department of Agriculture, Co-Operation & Farmers Welfare Ministry of Agriculture & Farmers Welfare Government of India.

Goswami, S.N. and Challa, O. 2006. Land Use scenario in Meghalaya- An Exploratory analysis. *Agricultural Situation in India*, **6**(12): 531-535.

Singh, R.P. and Prakash, J. and Singh, A.K. 2020. Resource use scenario in Indian Agriculture- An analytical approach. *Agro Economist- An International Journal*, **7**(1): 31-37.

Singh, R.P. and Prakash J. 2012. Economics of marginal and small holding, Agricultural situation in India, **LXIX** (9): 529- 533.

Singh V.P. and Singh O.P. 1989. Land utilization pattern and distribution of operational land holding in India-Analytical Approach. *Agricultural Situation in India*, 56(6): 191-197.