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India: Greater the Population Lesser the Agriculture

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***Abstract*: Agriculture is the backbone of any society and India is a global agricultural powerhouse. Agriculture gives food security to the swiftly growing population in the country as well as provides employment on a very large scale. India is currently the world's second largest country in terms of population after China. The current population of the country is growing at an alarming rate and witnessing a horrific population explosion, which can lead to the problems of food insecurity, water, space, unemployment, poverty etc. The continuous population growth decreases the land sizes continuously, which directly affect the agricultural production of the country. So, we have to set up a positive correlation between agriculture and population. Otherwise, we may face the risk of food shortage in coming years. The challenges of a large population and less agriculture can only be managed by identifying the core areas of research and development under different agricultural sectors. The present article will provide a brief dimension on some of these key issues.**

***Keywords*: Agriculture, Climate Change, Food Security, India, Migration, Population, Poverty.**

1. Introduction

Agriculture plays a crucial role in India's economy. The cultivation of crops started during 7500 B.C and the concept of agriculture has been greatly changed during the last 50 to 60 years due to the advancement in agricultural technologies [1]. India is a developing country with nearly 1.38 billion Population of which 65% of the rural population is relied on agriculture for their livelihood as per United Nations data (UN) [2].

FAO According to the Food and Agriculture Organization of the United Nations (UN) the root causes of rural migration is rural poverty and food security because about 75 % of the world's poverty-stricken and food insecure population lives in rural areas and is mostly dependent on agriculture for their livelihood, but due to lack of technology and marketing availability migration becomes an important part of the strategies of rural households for improving their livelihoods [3].

India has the 2nd largest population after China in the world out of 237 nations (2021 estimated) [4]. As per "World Population to 2300" a report by United Nations organization India will have 1.46 billion people by 2100 comprising 29% of the Asian population [5]. The country ranks 94 among 236 nations in population growth with a growth of 1.04% (2021 estimated) [6]. The increasing population possesses a huge challenge to agriculture, and from there to the farmers. The major challenge it holds is to food security, the agriculture needs to produce sufficient food grains for the growing population. The effects of the increasing population on Indian agriculture are as follows.

A. Pressure on land

The population pressure on land can be defined as the comparison between the total population and total area for feasible living [7]. There are some factors within a population that reduce the ability of an environment to support the population and that therefore tend to result in migration and some other serious issues.

India faces drastic pressure on agricultural land. About 43% of the land is under cultivation which is the highest in the world [8]. Table 1 depicts the land utilization pattern in India from the year 1950-51 to 2014-15. The net sown area of the country has increased from 118.75 million hectares in 1950-51 to 140.13 million hectares only in 2014-2015. Over the last fifty years, the population of India has increased drastically, but the stagnation in the net sown area of the country can be seen over the years, the area has either decreased or increased from 1990-91 to 2014-15[9]. So, we have very less agricultural land available to feed each person in India.

Table 1
Agricultural Land by Use in India, 1950-51 to 2014-15.

S.No.	Classification	1950-51	1990-91	2000-01	2009-10 (P)	2010-11 (P)	2011-12 (P)	2012-13 (P)	2013-14 (P)	2014-15 (P)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
I.	**Geographical Area**	**328.73**	**328.73**	**328.73**	**328.73**	**328.73**	**328.73**	**328.73**	**328.73**	**328.73**
II.	**Reporting Area for Land Utilisation Statistics**	**284.32**	**304.86**	**305.19**	**307.41**	**307.48**	**307.39**	**307.49**	**307.80**	**307.82**
	1. Forest	40.48	67.81	69.84	71.56	71.59	71.60	71.57	71.83	71.79
	2. Not Available for Cultivation (A+B)	47.52	40.48	41.23	43.33	43.58	43.53	43.58	43.86	43.88
	(A) Area Under Non-agricultural Uses	9.36	21.09	23.75	26.16	26.40	26.31	26.50	26.91	26.88
	(B) Barren & Un-culturable Land	38.16	19.39	17.48	17.18	17.18	17.22	17.07	16.95	17.00
	3. Other Uncultivated land excluding Fallow	49.45	30.22	27.74	26.50	26.15	26.11	26.08	25.83	25.83
	(A) Permanent Pasture & other Grazing Land	6.68	11.40	10.66	10.34	10.30	10.31	10.26	10.26	10.26
	(B) Land under Miscellaneous Tree Crops &	19.83	3.82	3.44	3.21	3.20	3.16	3.18	3.19	3.10
	(C) Culturable Waste Land	22.94	15.00	13.63	12.95	12.65	12.64	12.64	12.39	12.47
	4. Fallow Lands (A+B)	28.12	23.37	25.04	26.85	24.60	25.18	26.32	24.85	26.18
	(A) Fallow Lands other than Current Fallows	17.45	9.66	10.27	10.84	10.32	10.67	11.04	10.69	11.09
	(B) Current Fallows	10.68	13.70	14.78	16.01	14.28	14.51	15.29	14.15	15.09
	5. Net Area Sown (6-7)	118.75	143.00	141.34	139.17	141.56	140.98	139.94	141.43	140.13
	6. Total Cropped Area (Gross Cropped Area)	131.89	185.74	185.34	189.19	197.68	195.80	194.25	200.95	198.36
	7. Area Sown more than once	13.15	42.74	44.00	50.02	56.12	54.82	54.31	59.52	58.23
	8. Cropping Intensity*	111.07	129.89	131.13	135.94	139.64	138.88	138.81	142.09	141.55
	Net Irrigated Area	**20.85**	**48.02**	**55.20**	**61.94**	**63.67**	**65.71**	**66.29**	**68.12**	**68.38**
	Gross Irrigated Area	**22.56**	**63.20**	**76.19**	**85.09**	**88.94**	**91.79**	**92.25**	**95.77**	**96.46**

* Cropping Intensity is percentage of Gross Cropped Area to Net Area Sown.
(P) Provisional

Source: Department of Agriculture cooperation and Farmers Welfare, Ministry of Agriculture and Farmers welfare, 2017 [9].

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Table 2
Number of operational Holdings as per Different Agriculture Census of India [11]

Operational Holdings	1970-71	1976-77	1980-81	1985-86	1990-91	1995-96	2000-01	2005-06	2010-11	2015-16
Marginal	36200	44523	50122	56147	63389	71179	75408	83694	92826	100251
Small	13432	14728	16072	17922	20092	21643	22695	23930	24779	25809
Semi-medium	10681	11666	12455	13252	13923	14261	14021	14127	13896	13993
Medium	7932	8212	8068	7916	7580	7092	6577	6375	5875	5561
Large	2766	2440	2166	1918	1654	1404	1230	1096	973	838

Source: Agriculture Census, Department of Agriculture & Farmers Welfare

B. Small and Fragmented Land Holdings Subsection

In India traditionally the land which a father owns is divided among his children as the inheritance. So, the larger land is further divided into small pieces of land among the children. India holds 90th place in the birth rate i.e., 17.53 births/1000 population among 228 nations (2021 estimated) [10]. The position shows the huge growth in the population and simultaneously reduction in the area of land that one person owns. Hence, the number of marginal farmers is increasing day by day in the country.

As the following Figure 1 and Table 2 shows the increase in the number of marginal land holdings in India over the years. As per the agriculture censuses of India, the number of marginal operational landholdings has increased has from 36200 in 1970-71 to 100251 in 2015-16 and the number of large operational landholdings has decreased from 2766 in 1970-71 to 838 in 2015-16. Also, the increase in Small and Semi-medium landholdings can be seen [11].

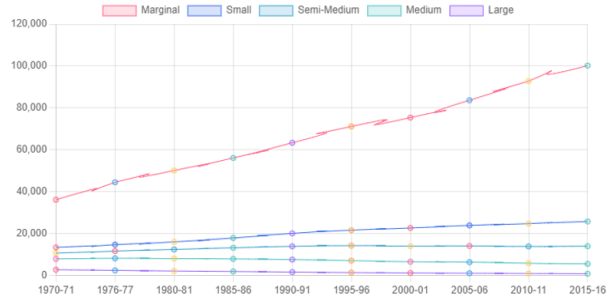

Fig. 1. Graph of Number of Operational Holdings as per Different Agriculture Census of India [11].

Source: Agriculture Census, Department of Agriculture & Farmers Welfare.

As per agricultural Statistics 2020, the average size of landholding of marginal, small, semi medium, medium and large farmers is 0.38, 1.40, 2.69, 5.72, 17.07 hectares respectively [12]. Indian agriculture serves as a home for small and marginal farmers (80%) [13]. These marginal and small lands are cultivated by farm labourers or tenants or family. The major part of the land in India is being cultivated by marginal farmers (Agriculture census 2015-16) [11]. The contribution in output by small and marginal farmers ranges from 19 per cent to 86 per cent in Punjab and West Bengal respectively [14]. Mostly specialized crops are grown by these small and marginal farmers which are more exposed to risk due to uncertain weather conditions, other than this they have very limited access to technology, inputs, credit, capital etc. and very low employment in farm and non-farm sectors which pulses them into poverty trap [14]. As small and marginal farmers contribute a lot to the food production but with the above-mentioned constraints they could not perform to their full potential and if the same conditions persist the country's food security will be in danger with the increasing population.

C. Need for Development

As the population is growing the living standards of people of the country are also growing.

The Human Development Report 2020 shows the HDI value of India as 0.654 [16] as compared to 0.647 [17], 0.640 [18] in the year 2019, 2018 respectively which shows the increase in living standards, health, knowledge of individuals. Due to these increasing living standards, people are seeking development and as a resort, they are migrating to the more developed cities leaving behind their village agricultural lands.

1) Migration

In the sense of human beings, it may be defined as the process of movement of people from one place to another. According to the Census 2011 the number of migrants by place of last residence with duration of residence as 0 to 9 years in India are as follows [19]

By place of Last residence:

- Total population migrants: 1,34,613,810
- Rural population migrants: 93,535,900
- Urban population migrants: 41,077,910

The data shows the high amount of rural emigration. As reported by Singh, H. (2016) the volume of migrants from rural-urban in India is the second largest stream [20]. Factors responsible for rural-urban internal migration can be grouped into two namely push and pull factors. Push factors involve the problems which compel the people to move out of a place such as unemployment, poverty, lack of development, natural calamities etc. [21,22] some other push factors can be family conflicts, soil/land erosion etc. Pull factors include the better living standards which urge people to immigrate to a place such as better facilities, employment opportunities, education etc. [21,22].

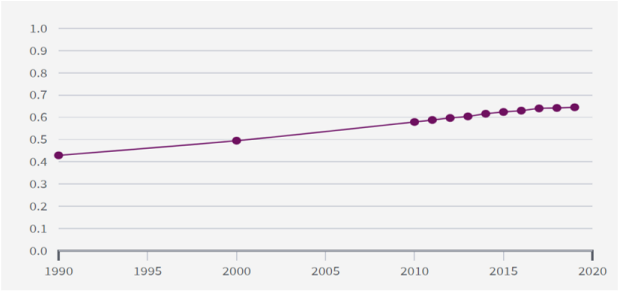

Fig. 2. Graph Shows the Trends in HDI of India from 1990-Present.

Source: India, Country Profiles, Human Development Reports, UNDP [15].

The effects of migration on agriculture are as follows:

Reduction in availability of agriculture labourers in rural areas which pressurise the few labours practicing agriculture in rural areas to meet the food production demands of nearby markets, these internal migrants to the urban areas increase the pressure on agriculture lands as well as non-agriculture lands for food production along with land for accommodation, creating problems such as deforestation and climate change at greater levels in urban areas which directly or indirectly affect the rural agriculture. The urban internal migrants create a glut of labourers in urban areas which sometimes leads to unemployment and poverty. These factors surely affect the food security in one way or another.

2) Climate change

The increasing population and developmental needs are leading to deforestation, increase in burning of fossil fuels leading to increased greenhouse gases emission hence, acting as a fuel to global warming [23]. A study by the Centre for Biological Diversity said that greenhouse gas emission per capita may drop but the increasing population will contribute continuously to the greenhouse gases [24]. Global warming will surely affect the rainfall and temperature patterns. The temperature will rise over the time which accelerates the plant growth by speeding its development but the crop yield will be severely affected. Increased temperatures lead to high evapotranspiration [25]. It has both direct and indirect effect on agricultural productivity ranging from changes in rainfall pattern, drought, flood, increasing temperatures [26]. The climate change is reducing the agricultural yield and along with-it deterioration of the quality of major cereals [27]. The climate change is possessing a huge challenge to the overall food security for increasing population. The drastic climate transitions will surely affect the food production, sustainable agriculture practices can limit or reduce the impact of climate change in agriculture.

2. Conclusion

In all the root cause which can threaten the food security in India is the increasing population and drawbacks which come along with it. To tackle this problem integrated approach including increasing population, climate change, excess urban internal migration, small and fragmented lands need to be introduced in the country. India needs to strictly follow Climate-Smart Agriculture an integrated approach by World Bank to managing landscapes-cropland, livestock, forest and fisheries that address the interlinked challenges of food security and climate change [27]. It aims to achieve these three outputs: increased productivity, enhanced resilience, reduced emission of carbon [27]. For population check, India needs to make strict laws to control the population and enforce the same, so the drastic conditions such as famine can be avoided at the forefront. To reduce the rural internal migration and to take rural development hand in hand the targeted policies especially for rural youth and women must be formed, Rural education and vocational training must be organised to meet the demand and the need of labour markets, encouragements of sustainable agriculture must be done [3]. There must be the better reach of government policies in rural areas in order to boost up the rural agriculture. The terms and conditions for taking up the loans from formal sectors in the country should be made more flexible so that the large section of farmers which is small and marginal farmers can get their benefits and perform and produce to their maximum potential.

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