



Research Paper

A Study On The Impact Of Climate Change On Agriculture: A Bird's Eye View of Perambalur District “Everything else can wait; but not agriculture” – Jawaharlal Nehru

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ABSTRACT

India is mainly a nation that is agricultural. It is the country's backbone. It is a big sector of the economy of the state. This is where most people earn their livelihood. The agricultural sector provides opportunities for vast numbers of people. All the family members are engaged in agricultural work in several villages. While farmers face so many obstacles, due to family circumstances, affinity for agriculture and lack of knowledge on the part of other occupations, they still wish to pursue agricultural work. People will save the earth by reducing the technical activities, so that pollution can be reduced. In terms of pollution control and global warming control, even the developed countries are too in crucial. In order to save agriculture and to reduce the depletion of ground water, to recharge ground water, people should give priority to saving rain water.

KEYWORDS: Climate change, Rainfall, Agriculture, Irrigation, Production, Productivity

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I. INTRODUCTION:

India is mainly a nation that is agricultural. It is the country's backbone. It is a big sector of the economy of the state. This is where most people earn their livelihood. The agricultural sector provides opportunities for vast numbers of people. All the family members are active in agricultural works in many villages. Although farmers face so many obstacles, due to family circumstances, passion for agriculture as well as lack of knowledge on the part of other occupations, they still wish to pursue agricultural work. Drought, global warming and climate change are some of the most important factors which affect the agricultural sector. These are all inter-related.

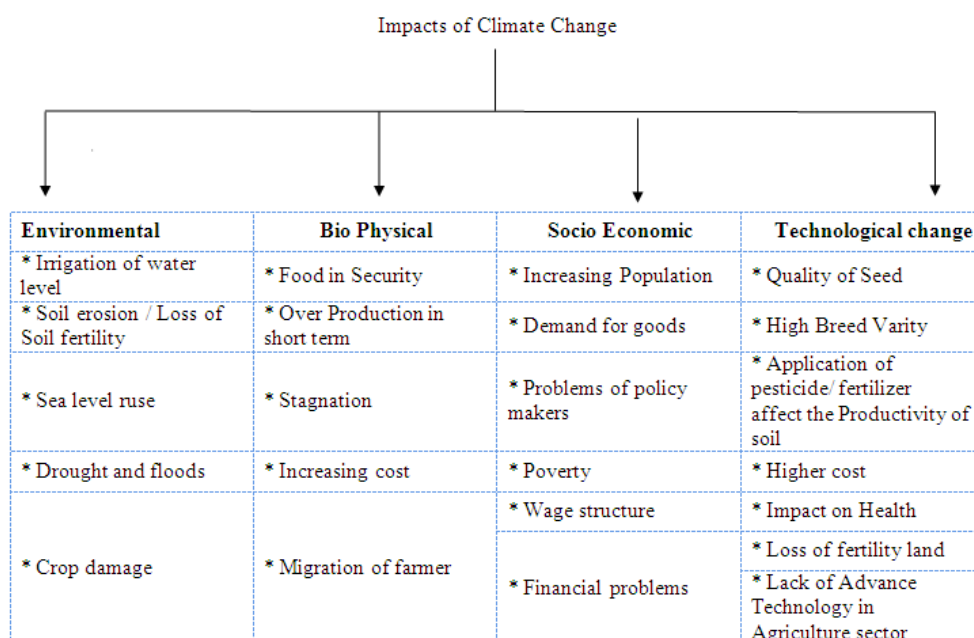
Climate Change:

Climate Change refers to the difference over time in the global climate of the earth or regional climate. Climate change will interrupt the supply of food, decrease access to food and affect the quality of food. For example, predicted temperature increases change in precipitation patterns Changes in severe weather events and decreases in the availability of water all should contribute to decreases in agricultural productivity.

Global Warming:

The rise in the Earth's average temperature is known as global warming. As hotter disasters such as hurricanes, droughts and floods become more common on Earth. The basic causes for global warming are human activities, industrial sector growth and the development of trade activities that produce pollution. The agricultural sector is mainly dependent on soil fertility, which is the source of irrigation and, in turn, depends on the amount of rainfall. In particular, with special reference to the Perambalur District, this paper focuses on how climate change affects the level of irrigation, area sown, etc.

The following chart explains how the agricultural sector is affected by climate change.



Objectives:

1. To know about the irrigation (with special reference to Perambalur District) including the sources of water supply for three years from 2014 to 2017.
2. To learn about the source wise net area irrigated from 2014 to 2017 in the Perambalur District.
3. To classify the region sown and irrigated from 2014 to 2017.
4. To know about the Production for three years from 2014 to 2017.
5. To know about the Productivity for three years from 2014 to 2017.

Some of the reviews were compiled and discussed in order to understand the climate change and its effects on agriculture.

II. REVIEW OF RELATED LITERATURE:

Geethalakshmi and others pointed out in their studies, "Impact of climate change pose a serious threat to food security and need to be much better understood. As climate change projections form the basis for assessing the impact on crop production and developing adaptation strategies, reliable future changes with reduced level of uncertainty are increasingly important." (*Climate Change Projections Current Science*, Vol. 101, No.3, 10 August 2011 pp.342)

Geethalakshmi and others pointed out that, "ADT 43 rice variety was used and there are reports indicating that the choice of variety makes a difference between increase and decrease in the yield while being exposed to climate change scenarios.

The reduction in yield of crop might be mainly due to increase in both maximum and minimum temperature as well as variation in rainfall. (*Climate change Projection and Impact for India Current Science*, Vol. 101, No.3, 10 Aug 2011, pp.346)

The major crops grown in the Thanjavur district are Paddy, Pulse, Gingelly, Groundnut and Sugarcane, according to Chitra. Paddy is the main crop that has been cultivated for three seasons like Kurvai, Thaladi and Samba. Today, the paddy production is affected by the monsoon, cyclone, flood, drought conditions during the Rabi season. (*Global Warming and its impact on Agriculture, Kurkshetra*, Vol.10, 2010 Aug- pp-34)

Ruchitra. S.and Rohit. S, in their article highlighted that overall temperature rise is likely to be much higher during winter (Rabi) rather than in rainy season (Kharif), moreover it is predicted that the average temperature in India is expected to increase by 0.4 - 2.0°c in Kharif and 1.1 - 4.5 °c in Rabi by 2070. The decline in agricultural productivity leads to a rise in food prices at the state level, as well as one of the major factors affecting India's agriculture, resulting in greater instability. (Effect of Global warming on India agriculture, Journal of climatology & weather forecasting Vol.5; issue: 1000195).

Matthew Smith and Samuel Myers 'Journal Nature climate change'(2018), Pointed out that food crops could reduce the content of protein, iron and zinc in common food crops by 3% to 17%.

In India, the agricultural sector is vulnerable to climate change. Higher temperatures tend to decrease crop yields and encourage the growth of weeds and pests. Due to temperature increase and changes in water availability, climate change can have negative effects and irrigated crop yields across agro-ecological regions.

III. METHODOLOGY:

For the period from 2014-15 to 2016-17, Secondary data was obtained. For the data, diagrams like bar and trend were used.

Study Area:

After the trifurcation of the Tiruchirappalli district with effect from 30.09.1995, Perambalur District came into existence. It is bordered by the northern districts of Cuddalore and Salem. Tiruchirappalli South, Ariyalur district East. It is bordered by the districts of Tiruchirappalli and Salem in the West. The district has an area of 1,756 Sq. Km, spread between latitudes of 10°54 and 11°30° north and longitudes of 78°40° and 79°30° east.

Typical Weather of Perambalur District:

Under the influence of both the South-west and the North-east monsoons, the district receives rainfall. For the period 1901-70, the normal rainfall ranged from 843.5 to 1123.33 mm. It is the lowest in the areas of Vembavur and the highest in the areas of Jayamkondam.

During the South-west monsoon season, the district enjoys heavy winds. The wind speed is over 25 km/hr from June to August. Then there will be a steady decrease in velocity to the lowest value of 7.7 km/hr.

Rainfall Projections for Perambalur District:

The Perambalur district's regular annual rainfall from 1970 to 2000 is 949 mm. For the periods 2010-2040 (2020s), 2040-2070 (2050s) and 2070-2100 (2080s) with comparison to the base line (1970-2000), rainfall forecasts in Perambalur show a decrease of 3.0%, 3.0% and 7.0% respectively.

Table No.1
Rainfall Forecasts in Perambalur District

Perambalur	2020s	2050s	2080s
Annual rainfall	-3.0%	-3.0%	-7.08%

Source: IMD, 2013 Rainfall of Perambalur District. Regional Metrological Centre, Chennai.

According to the A 113 emission scenario, the annual rainfall for the district of Perambalur may decrease to 7.08 percent by the end of the century. In the district, the main river is Kollidam. Ellar, Kallar, Swedanadhi, Koneri, Elunur, Periyavari- Anaivari, Illaiyur, Udaiyarpalayam and Mandiyar are the sub-basins. Perambalur district, being a rain fed district, is among the first ten places in Tamilnadu's total food grain production. Groundwater over-exploitation in the following blocks: Alathur, Perambalur, Veppanthattai and Veppur (Ground water Development Board, Perambalur District.)

Table No. 2
Level of Rainfall in Perambalur District

Year	Rain fall in mm
2014	561.1
2015	697.22
2016	909
2017	901

Source: Statistical Department of Perambalur.

Table No.2 above indicates the amount of rainfall received from various years.

Gross irrigated area:

This is the total area irrigated once and more than once a year for crops. It is counted as many times in one year as the number of times the areas are grown and irrigated.

Net irrigated area:

It is the region for a specific crop that is irrigated once a year by every source.

Table No.3
Irrigation details of Perambalur District

Year	Canals		Tube wells & Other wells	Open Wells	Wells used for Domestic purpose only	Reservoirs	Tanks
	Number	Length (Km.)					
2014-15	1	3	3711	33863	7390	1	252
2015-16	1	3	3700	33874	7509	1	252
2016-17	1	3	3729	33779	8103	1	252

Source: Department of Economics and Statistics, Chennai-600006.

The above table-3 shows that in Perambalur district, the number of canals in 2014-15 to 2016-17 is the same as the number of tanks is also the same as 252. Although the need for wells for domestic purposes is the same, tube wells and open wells are also the same. It is important to dredge open wells, reservoirs, wetlands, and so irrigation is likely to increase and the number of water tanks should be increased.

Table No. 4
Source-Wise Net Area Irrigated by Perambalur District
(In Hectares)

Year	Canals	Tanks	Tube wells & Other wells	Open Wells	Other Source	Total
2014-15	0	2141	3015	21029	0	26185
2015-16	0	2634	2507	26612	0	31753
2016-17	0	0	1842.097	22456.9	0	24299

Source: Department of Economics and Statistics, Chennai-600006.

The above table no-4 indicates that there is a decline in Tube wells and other wells (in Hectare) decreased relatively to the previous two years 2014-15 and 2015-16, where as the overall net irrigation decreased in 2016-17 when compared to previous two years.

Table No. 5
Area Sown and Irrigated by Perambalur District

Year	Gross Area Irrigated	Gross Area Sown	Percentage %	Net Area Irrigated	Net Area Sown	Percentage %
2014-15	26185	105541	24.81	32644	112717	28.96
2015-16	46203	122106	37.84	31753	106052	29.94
2016-17	26081	98376	26.51	24299	96139	25.27

Source: Department of Economics and Statistics, Chennai-600006.

The above Table No.5 indicates that the percentage of area sown increased in 2015-16, as the total irrigated area sown in 2015-16 grew to 37.84, particularly in comparison to 2014-14 and 2016-17.

Table No. 6
Production in the District of Perambalur for the years 2014-15 to 2016-17 (In Million Tonnes)

Sl. No.	Crops	2014-2015	2015-2016	2016-2017
1	Paddy	44089	65435	12959
2	Cholam	3754	1146	433
3	Maize	409722	315661	136059
4	Varagu	39	359	189
5	Cumbu	173	180	283
6	Ragi	9	3	499
7	Total Millets	413697	317349	137463
8	Redgram	1902	1407	242
9	Blackgram	369	667	438
10	Greengram	4	2	0
11	Other pulses	1	1	6
12	Total Pulses	2276	2077	686
13	Groundnut	4125	8310	1656
14	Gingelly	142	169	43

15	Sunflower	351	32	47
16	Caster	148	77	76
17	Total oilseed	4766	8588	1822
18	Cotton	35484	18059	16944
19	Sugarcane	569211	766539	409346

Source: Statistical Department of Perambalur.

Production for the various years is shown in Table No.6.

Perambalur district is famous for the production of Paddy, Maize, Cotton & Sugarcane when compared to the years 2014-15, 2016-17 the production of Paddy has increased in 2015-16 like Sugarcane also in remarkable place of growth in 2015-16.

Table No.7

Area Productivity in Perambalur District for the years 2014-15 to 2016-17 (In Million Tonnes)

Sl. No.	Crops	2014-2015	2015-2016	2016-2017
1	Paddy	4.902	4.644	3.865
2	Cholam	1.734	1.246	0.516
3	Maize	11.131	5.820	2.753
4	Varagu	1.786	1.786	1.786
5	Cumbu	1.716	1.716	1.716
6	Ragi	1.289	1.289	1.290
7	Total Millets	3.531	2.371	2.251
8	Redgram	1.300	1.733	0.307
9	Blackgram	0.803	0.803	0.892
10	Greengram	0.516	0.516	0.516
11	Other pulses	0.350	0.221	0.235
12	Total Pulses	0.594	0.655	0.543
13	Groundnut	2.842	2.842	1.440
14	Gingelly	0.330	0.330	0.330
15	Sunflower	1.144	1.144	1.144
16	Caster	0.550	0.550	0.550
17	Total oilseed	1.216	1.216	1.039
18	Cotton	0.886	0.886	0.807
19	Sugarcane	94.262	94.262	81.284

Source: Statistics Department Perambalur.

The above table No. 7 shows the productivity of crops for the various years. The Productivity of all the crops decreased in 2016-17 (in million tonnes) when compared to the previous years.

Suggestions:

1. The only lasting solution is the interlinking of rivers.
2. It is important to increase the number of boring wells.
3. To produce new bore wells, the government should take steps.
4. Maintenance costs should be allocated on a periodic basis to maintain the bore wells in order to maintain both output and yield.
5. For household and personal purposes, a separate water supply source should be arranged. Increase forest cover areas in each panchayat and plant trees in the unused land of government, River banks etc., and the concerned panchayat many enjoy carbon credit.
6. For rainwater, both working and obsolete bore wells should be used. And harvesting should be made compulsory.
7. Both river banks should be reinforced during the summer and rivers and drainage/irrigation channels should be washed.
8. It is important to implement flood/Drought tolerant varieties.
9. For the irrigation infrastructure, the building of more dams and tanks is useful.
10. Land water management and recharge of ground water is a must for sustainable development for that government should allocate funds for special projects.
11. Ground water should be classified.
12. It is important to punish the industries that cause water pollution, swindling agricultural land by charging heavy taxes and penalties.
13. A suitable programme should be conducted especially for the farmers to remote production.
14. Government should motivate the farmers to go for alternative type of cultivation of crop according to the availability of water.
15. Farmers can go for short term crop (Kuruvai) because of Kuruvai harvest earlier will not be affected by North-east monsoon.

IV. CONCLUSION:

By reducing the technological practices, the individuals can save the world, so that emissions can be minimized. Developed countries are critical for the control of pollution and the control of global warming. People should give priority to saving rain water in order to save agriculture and reduce the depletion of ground water, to recharge ground water.

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