Rice Cultivation in Haryana: A District Wise Feasibility Analysis on Climate Conditions from 2002-2012

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Abstract: *"Man is a geographical agent and not the least" Lician Febre, means the approach of possibilism can be explained with the help of not only cultivation but also with huge production of Rice in Haryana state. The production in 2001-02 of rice was 2726000 tons which goes to 3759000 tons in 2011-2012. The above data eliminate the climatic constraint of rice cultivation but the other side of the same practice is not as good as the areas which are fit for rice cultivation on ideal climatic conditions. The problems which are associated with artificial cultivation of rice in' not suitable rice cultivation areas' focus much more future attention than the present production i.e. problem of water logging, fluctuation in under water table, production of Methan gas etc.*

Key Words: - Climatic Conditions, Electrical Conductivity, Ph Value

Introduction: However all crops have a certain climatic limit of germination of seed, growing of plants and ripening of grains/fruits. But in case of rice the crop shows a very lean relationship with climatic conditions and due to the same deltai areas of west Bengal and other states grow three crops of rice in a year which describe a symbiotic relationship of rice cultivation and climatic conditions. However with the help of modern technology package rice can grow in many climates but optimum conditions for rice cultivation are: A temperature range of 20° to 40°C but 30°C during day & 20°C during night is optimum along with this at the time of flowering and fertilization temperature should be between 16°C to 20°C and at the time of ripping it should be 18°C to 32°C. An intensive solar radiation with clear sky during last 35 to 45 days of ripening period is more profound, where water, temperature and nitrogenous nutrients are not limiting factors. Bright sunshine during ripening period of crop helps in development of carbohydrates in grains. An average rain fall between 125cm to 150cm is optimum. In case of soil clay soil with organic matter having good water retention capacity is considered for ideal cultivation of rice. The Ph range of soil between 5 to 8 is suitable for rice cultivation.

On the other hand Haryana state shows a vast versatility with regard to present climatic conditions and optimum climatic conditions for rice cultivation. A comparison between present

climatic conditions and optimum climatic conditions at district level clearly tell the results which do not favor cultivation of rice especially summer rice cultivation in Haryana.

Objective of Study: To find out climatic feasibility of rice cultivation in Haryana at district level.

Data Sources and Methodology: The present study is based on published and unpublished data taken from various sources i.e. statistical abstract of Haryana (Different issues), central ground water board NW region Chandigarh, en-climate-data.org/location, department of agriculture and farmer welfare Haryana, India Metrological Department etc.

Method of comparative technique is used via tabulation of data to check feasibility of summer and monsoonal rice cultivation at different climatic check points.

Area of study: The area cover the 19 district* of Haryana, with a latitude and longitude dimension of 27°39'00''N to 30°55'00''N and 74°27'00''E to 77°35'00''E respectively.

*At present there are 22 districts in Haryana but at the initial phase of data collection there were 19 districts in Haryana.

Interpretation and Analysis of Data: Table 1 shows the district wise feasibility of Rice cultivation at different climatic check points.

Table 1

Feasibility of Rice Cultivation

District	Present Climatic Conditions					Optimum Climatic Conditions					Diff. B/W N.C & O.C			Natural Feasibility		
	R.F	Temp.		Soil	Terrain	R.F.	Temp.		Soil	Terrain	R.F	Temp.		Lev. 1	Lev. 2	Lev. 3
	(mm)	T_G	T_R			(mm)	T_G	T_R			(mm)	T_G	T_R (-ve)			
Ambala	193.1	30.7	22	Alluv.	Flat	1250	24	27	T1	Flat	1056.9	6.7	5	Unfit	Fit	Unfit
Panch.	207.6	30.1	21.7	Alluv.	Flat	1250	24	27	T1	Flat	1042.4	6.1	5.3	Unfit	Unfit	Fit
Y.Nagar	194.9	30.1	21.7	Alluv.	Flat	1250	24	27	T1	Flat	1055.1	6.1	5.3	Unfit	Fit	Unfit
Kuruksh.	79.63	30.1	22.1	Alluv.	Flat	1250	24	27	T1	Flat	1170.4	6.1	4.9	Unfit	Fit	Unfit
Kaithal	91.95	30.8	22.4	Alluv.	Flat	1250	24	27	T1	Flat	1158.1	6.1	4.6	Unfit	Fit	Unfit
Karnal	87.07	30.3	22.1	Alluv.	Flat	1250	24	27	T1	Flat	1162.9	6.3	4.9	Unfit	Fit	Unfit

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Panipat	110.9	30.5	22.3	Alluv.	Flat	1250	24	27	T1	Flat	1139.1	6.5	4.7	Unfit	Fit	Unfit
Sonipat	120.9	30.8	22.7	Alluv.	Flat	1250	24	27	T1	Flat	1129.1	6.8	4.3	Unfit	Fit	Unfit
Rohtak	88.75	31.1	22.8	Alluv.	Flat	1250	24	27	T1	Flat	1161.3	7.1	4.2	Unfit	Fit	Unfit
Jhajjar	95.67	32.2	23.1	Alluv.	Flat**	1250	24	27	T1	Flat	1154.3	8.2	3.9	Unfit	P. Fit	Unfit
Farid.	122.8	30.1	22.1	Alluv.	Flat	1250	24	27	T1	Flat	1127.2	6.1	4.9	Unfit	Fit	Unfit
Gurgaon	113.3	31.1	23	Alluv.	Flat**	1250	24	27	T1	Flat	1136.7	7.1	4	Unfit	P. Fit	Unfit
Rewari	105.1	31.1	23.1	Arid	Sand Bar	1250	24	27	T1	Flat	1145	7.1	3.9	Unfit	Unfit	Fit
M. Gargh	100	31	23.1	Arid	Sand Bar	1250	24	27	T1	Flat	1150	7	3.9	Unfit	Unfit	Fit
Bhiwani	74.41	31.3	23	Arid	Sand Bar	1250	24	27	T1	Flat	1175.6	7.3	4	Unfit	Unfit	Fit
Jind	111	31.1	22.6	Alluv.	Flat	1250	24	27	T1	Flat	1139.1	7.1	4.4	Unfit	Fit	Unfit
Hisar	55.08	31.5	22.6	Mix	Flat**	1250	24	27	T1	Flat	1194.9	7.5	4.4	Unfit	P. Fit	Unfit
Fateha.	62.02	31.5	22.7	Mix	Flat	1250	24	27	T1	Flat	1188	7.5	4.3	Unfit	Fit	Unfit
Sirsa	44.36	31.9	22.8	Mix	Flat**	1250	24	27	T1	Flat	1205.6	7.9	4.2	Unfit	P. Fit	Unfit

Abbreviation:- T_G : Temp. at growing(24°C) time.
T_R : Temp. at ripening (27°C) time.
T1 : Soil having good water retention capacity.
N.C: Natural Conditions
O.C: Optimum Conditions
Lev. 1- Level 1, Lev.2- Level 2, Lev.3- Level 3
R.F : Rainfall in (MM)
** some portion are not flat because of presence of sand bar.
Sources: Statistical Abstract of Haryana (Different issue) & central ground water board.

Level 1:- Feasibility at all natural points i.e. R.F, Temp., soil, Terrain, Ph. Value & Electrical Conductivity.

Level 2:- Feasibility at all natural points except Rainfall because of optimum sources of irrigation & use of HYV seeds.

Level 3:- Feasibility does not sustain because of lack of two or more than two points of natural selection i.e. R.F & Soil Terrain/Texture.

Table 1 shows the result of feasibility at 3 different levels i.e. level 1, level 2 and level 3. Here all 19 district under level 1 does not fit for rice cultivation as a natural selection because

there is huge difference in present rainfall & optimum rainfall and it is the only with the help of technology package (irrigation, use of HYV seeds etc.) that some district write their name in list of level 2 feasibility but the cost of irrigation especially with the help of tube wells/bore wells in some districts where canal system is not so intense results in low economic feasibility of rice cultivation. The district like Rewari, Mahendergarh, S.W part of Jhajjar, Southern part of Gurgaon and Sirsa, S.W part of Hisar falls in category of level 3 which do not support more than 2 check points of natural selection and point of soil texture & terrain does not allow cultivation of rice at all because of high porosity of soil & very less or no water retention capacity.

Conclusion: The above study of natural selection of rice cultivation in Haryana vary from district to district and all 19 districts can be grouped under three category of fit, partial fit, and unfit. The study also revealed that all major rice producer district i.e. Karnal (165000 Hectare), Kaithal (158900 Hectare), Kurukshetra (121200 Hectare), Jind (114800 Hectare), Sonipat (94700 Hectare), Ambala (82600 Hectare) (Statistical Abstract of Haryana 2011-12) fall in the category of fit and level 2 of Table. Artificial irrigation through canal, tube wells, bore wells and drains play the role of arteries for rice cultivation in this area.

Suggestions: It has been analyzed from Table 1 that rice cultivation in Haryana is blessed of

irrigation facilities. But temp. of ripening shows a variance of -3 to-5°C which affect the yield of rice as has been proved by International Journal of Agronomy volume 2014, Article ID 846707. So instead of rice cultivation as a major crop if farmer try the practice of cultivation of leguminous crops which is best suitable at all natural check points of table, can get more economic value because of these crops needs less water, less fertilizer and also helps in fulfilling the some amount of nitrogen for their rabi crops because of their Nitrogen fixing character.

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