ESTIMATION OF PEOPLES' PERCEPTION ON CLIMATE CHANGE EFFECT ON AGRICULTURE: A PARTICIPATORY AND SOCIO-PERSONAL ANALYSIS

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Climate change has been recognized globally as an ever increasing threat to our planet. The economic and social implications of global climate change are the subject of intense national and international study in present day scenario. The present study has delved deeper into the peoples' perception on congenital effect of climate change on agriculture in regards to coastal agro-ecosystem of Odisha by taking 19 independent variables and dependent variable, Perceived Climate change effect on Agriculture (Y_{11}). The study has been based on a blend between participatory rural appraisal and a conventional multivariate statistical analysis including correlation coefficient, multiple regression analysis, path analysis, factor and canonical covariate analysis. Almost every year, within a cohort of last 53 years, coastal agriculture of Odisha has experienced brunt of 40 years of drought, flood or cyclones. This has been reflected in the stagnating yield of food crops over the couple of decades, which has negated the positive impact of modern technology and fertilizer application in the operating farms. The result shows that, the variables like, Age (X_1), Education (X_2)& Changing Expenditure Allocation on Education (X_{10}),change pattern of watching television, listening to radio, all have been redeemed into a dependable estimator of perception on climate change effect on agriculture.

Keywords: Agriculture, Climate change, Coastal agriculture, Perception.

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Introduction

The economic and social implications of global climate change are the subject of intense national and international study in present day scenario.Rising CO_2 concentrations have lowered ocean surface pH by 0.1 unit since 1750 (Trenberth, 2007).Chilikacoastal ecosystem of Odisha coastal area presents a huge pool of hydro-ecological, bio-ecological and socio-ecological dynamics and transformational traits.Almost every year, within a cohort of last 53 years, coastal agriculture of Odisha has experienced brunt of 40 years of drought, flood or cyclones. This has been reflected in the stagnating yield of food crops over the couple of decades, which has negated the positive impact of modern technology in the operating farms. Added to it, the aspects of livelihood changes, migrations, erosion of ichthyofaunal diversity, problems of salinity, decline of productivity etc. are making the problem complex and polymorphic.The change dynamics are more important than the present of change itself. While change dynamics include the past and direction of change as well as of shifts, its impacts on futuristic plan and prospects, is immense. It has been projected that under the scenario of a 2.5 °C to 4.9 °C temperature rise in India, rice yields will drop by 32 %-40 % and wheat yields by 41 %-52 % (OECD, 2002). From a study, it was found that 50 per cent of the fishers have negative perception about the effect of climate change to fish production and only 22 per cent show positive approach to adopt different strategies aiming to reduce adverse effect of climate change (Roy, 2012).This paper reveals that access to education, ownership of land and land size of the farmers positively influence the perception on climate change and their decision to adapt to climate change.

Materials and Methods:

Table-1: Sampling Scheme (Multistage Random Sampling)

Step	Items	Level	Approach
1	State	Odisha	Purposive
2	District	Puri	Purposive
3	Block	Krushnaprasad, Brahmagiri	Purposive
4	Village	Malud, Satapada, Brahmagiri, Bentapur	Random
5	Respondents	80	Random

After collection of data, data were processed and analysed in accordance with the outline laid down for the purpose at the time of developing the research plan. Process implies editing, coding, classification and tabulation of collected data. The main statistical tools and techniques used in the present study are as follows:

1. Mean 2. Standard deviation 3. Coefficient of Variance

4. Correlation of coefficient 5. Multiple regression analysis 6. Path analysis

7. Canonical covariate analysis

A Pilot study was conducted before construction of data collecting schedule.

Variables and Empirical Measurement of the Variables

Decadal observations have been carried out. **Change in variables refers to change from 1980 to 2010.**

Table-2: Independent Variables

Sl No.	Variables	Notation	Score
1	Age	X_1	Chronological age
2	Education	X_2	Years of Schooling
3	Family Size	X_3	Number of family members
4	Family Education Status	X_4	Year of Schooling/Family
5	No. of Vehicles changed	X_5	In No.
6	Change in Consumption of Kerosene	X_6	Litre/month/family
7	Change in Consumption of Petrol	X_7	Litre/month/family
8	Changing Family Expenditure	X_8	Rupees/Month/Family size
9	Changing Expenditure Allocation on Farming	X_9	1-100 Scale
10	Changing Expenditure Allocation on Education	X_{10}	1-100 Scale
11	Changing Expenditure Allocation on Health	X_{11}	1-100 Scale
12	Change in Listening to Radio	X_{12}	In hours/month
13	Change in Watching T.V	X_{13}	In hours/month
14	Changing Interaction with Input Dealers	X_{14}	In hours/month
15	Changing Interaction with Extension Agent	X_{15}	In hours/month
16	Change in Farm Size	X_{16}	Holding/ Family size(ha.)
17	Changing Cropping Intensity	X_{17}	In %
18	Changing Cultivable Land	X_{18}	In ha.

19	Change in Fertilizer Application	X_{19}	Kg/Ha.

- Change refers to Decadal change from 1980 to 2010

Dependent Variable: Perceived Climate change effect on Agriculture (Y_{11}) - It refers to change in climate change effect on agriculture as per farmer's perception from 1980-2010 and calculated in 1-100 scale.

Results and Discussion

Table 3: **Descriptive statistics of independent variables with respected to Mean, Standard Deviation values.**

Sl.No.	Variables	Mean	SD	CV
1.	Age **(X_1)**	53.24	9.92	18.63
2.	Education **(X_2)**	4.94	4.15	84.01
3.	Family Size **(X_3)**	5.07	2.13	42.01
4.	Family Education Status **(X_4)**	6.09	2.30	37.77
5.	No. of Vehicles changed **(X_5)**	1.94	0.86	44.33
6.	Change in Consumption of Kerosene **(X_6)**	-2.30	1.23	-53.48
7.	Change in Consumption of Petrol **(X_7)**	8.59	10.45	121.65
8.	Changing Family Expenditure **(X_8)**	637.76	462.94	72.59
9.	Changing Expenditure Allocation on Farming **(X_9)**	3.38	10.90	322.49
10.	Changing Expenditure Allocation on Education **(X_{10})**	12.61	8.34	66.14
11.	Changing Expenditure Allocation on Health **(X_{11})**	7.05	5.66	80.28
12.	Change in Listening to Radio **(X_{12})**	-26.44	34.47	-130.37
13.	Change in Watching T.V **(X_{13})**	39.92	23.74	59.47
14.	Changing Interaction with Input Dealers **(X_{14})**	2.44	2.11	86.48
15.	Changing Interaction with Extension Agent **(X_{15})**	3.54	2.62	74.01
16.	Change in Farm Size **(X_{16})**	-0.14	0.30	-214.29
17.	Changing Cropping Intensity **(X_{17})**	51.71	27.40	52.99
18.	Changing Cultivable Land **(X_{18})**	0.10	0.69	690.00
19.	Change in Fertilizer Application**(X_{19})**	52.03	24.34	46.78

Coefficient of Correlation

Table No. 4: Coefficient of Correlation(r): Perceived Climate changing effect on Agriculture (Y_{11}) vs 19 independent variables

Sl.No.	Variables	R value	Remarks
1.	Age **(X_1)**	-0.3094	**
2.	Education **(X_2)**	0.0495	
3.	Family Size **(X_3)**	-0.0097	
4.	Family Education Status **(X_4)**	0.1180	
5.	No. of Vehicles changed **(X_5)**	0.1471	

6.	Change in Consumption of Kerosene **(X_6)**	-0.0955	
7.	Change in Consumption of Petrol **(X_7)**	0.1292	
8.	Changing Family Expenditure **(X_8)**	0.1310	
9.	Changing Expenditure Allocation on Farming **(X_9)**	-0.1248	
10.	Changing Expenditure Allocation on Education **(X_{10})**	0.3081	**
11.	Changing Expenditure Allocation on Health **(X_{11})**	0.1103	
12.	Change in Listening to Radio **(X_{12})**	-0.0555	
13.	Change in Watching T.V **(X_{13})**	0.0656	
14.	Changing Interaction with Input Dealers **(X_{14})**	0.1007	
15.	Changing Interaction with Extension Agent **(X_{15})**	0.0206	
16.	Change in Farm Size **(X_{16})**	0.2215	*
17.	Changing Cropping Intensity **(X_{17})**	-0.0499	
18.	Changing Cultivable Land **(X_{18})**	0.1394	
19.	Change in Fertilizer Application **(X_{19})**	-0.0494	
	r>0.220 significant at p=0.05(*) r>0.287 significant at p=0.01(**)		

Table 12 presents the coefficient of correlation betweenPerceived Climate change effect on Agriculture (Y_{11})and 19 independent variables.

Results: It has been found that variable, Age (X_1), has recorded strong negative significant correlation whereas variable,Changing Expenditure Allocation on Education (X_{10}) and Change in Farm Size (X_{16}) have recorded positive significant correlation with dependent variable, Perceived Climate change effect on Agriculture (Y_{11}).

Revelation: The young farmers are recognising effect of climate change on agriculture more than old age. Increasing expenditure on education leads to higher education and better perception on climate change effect on agriculture. Older traditional farmers are unable to recognise the brunt of climate change on agriculture. So, Age and Expenditure Allocation on Education, are two vital factor to estimate perception on climate change. As big farmers suffers from huge loss due to brunt of climate change for their higher farm size. So, big farmers have greater perception on climate change.

Regression Analysis

Table 5: Regression analysis: Perceived Climate change effect on Agriculture (Y_{11}) vs 19 causal variables (X_1-X_{19}) Multiple R sq. - 0.2467

S.L. No.	Variables	Beta	Beta x R	Reg. coef. B	S, error B	t value
1.	Age **(X_1)**	-0.391	**49.051**	-0.349	0.139	2.505

2.	Education **(X_2)**	-0.337	-6.763	-0.720	0.436	1.651
3.	Family Size **(X_3)**	-0.003	0.013	-0.014	0.620	0.022
4.	Family Education Status **(X_4)**	0.137	6.547	0.528	0.840	0.629
5.	No. of Vehicles changed **(X_5)**	0.069	4.113	0.709	1.518	0.467
6.	Change in Consumption of Kerosene**(X_6)**	-0.057	2.217	-0.414	1.166	0.355
7.	Change in Consumption of Petrol **(X_7)**	0.133	6.970	0.113	0.146	0.775
8.	Changing Family Expenditure **(X_8)**	0.075	3.991	0.001	0.004	0.382
9.	Changing Expenditure Allocation on Farming **(X_9)**	0.057	-2.889	0.046	0.125	0.371
10.	Changing Expenditure Allocation on Education **(X_{10})**	0.268	**33.499**	0.285	0.176	1.624
11.	Changing Expenditure Allocation on Health **(X_{11})**	0.047	2.118	0.074	0.202	0.368
12.	Change in Listening to Radio **(X_{12})**	-0.041	0.918	-0.011	0.035	0.302
13.	Change in Watching T.V **(X_{13})**	-0.195	-5.170	-0.073	0.058	1.242
14.	Changing Interaction with Input Dealers **(X_{14})**	0.137	5.596	0.576	0.620	0.929
15.	Changing Interaction with Extension Agent **(X_{15})**	-0.098	-0.821	-0.333	0.511	0.651
16.	Change in Farm Size **(X_{16})**	0.031	1.517	0.918	4.687	0.196
17.	Changing Cropping Intensity **(X_{17})**	-0.139	2.809	-0.045	0.041	1.083
18.	Changing Cultivable Land **(X_{18})**	-0.028	-1.603	-0.364	2.402	0.152
19.	Change in Fertilizer Application**(X_{19})**	0.106	-2.112	0.038	0.053	0.720

Step-down Regression analysis **Multiple R sq. = 0.1451**

Variable	Beta	t-value
Age (X1)	-0.236	2.125
Changing Expenditure Allocation on Education (X_{10})	0.234	2.108

The table 23 presents the Regression Analysis to estimate the causal effects of 19 exogenous variables on the respective dependent variable, Perceived Climate change effect on Agriculture (Y_{11}).

Result: It has been found that the variables, Age (X_1) & Changing Expenditure Allocation on Education (X_{10}) have contributed respectively 49.05% & 33.50% variance to the consequent variable, Perceived Climate change effect on Agriculture (Y_{11}).

Revelation: Climate change largely affects to agriculture due to its dependency on natural resources. Climate change is a crucial factor in the development of agriculture. Old age farmers

can't realize about the effect of climate change on agriculture, whereas perceived climate change effect is more in young farmers. Higher expenditure on education i.e. more the education, more they know about climate change. Young educated farmers are more aware of climate change and they have adequate perception on effect on agriculture than old age farmers.

So, Age & Changing Expenditure Allocation on Education can be key indicators to measure perceived Climate change effect on Agriculture. The R-sq. value is 0.2467, it is to imply that, 24.67% of variance embedded in consequent variable, Perceived Climate change effect on Agriculture (Y_{11}) with the combination of 19 exogenous variables.

Path Analysis

Table 6: Direct, Indirect & Residual effect; Perceived Climate change effect on Agriculture (Y_{11}) Vs 19 Exogenous VariablesResidual effect- 0.7533

Variables	Total Effect (r)	Direct Effect (DE)	Indirect Effect (IE)=r-DE	Highest Indirect Effect
Age(X_1)	-0.3094	-0.3912	0.0818	0.1355(X2)
Education(X_2)	0.0495	-0.3373	0.3868	0.1571(X1)
Family Size(X_3)	-0.0097	-0.0033	-0.0064	-0.1033(X1)
Family Education Status(X_4)	0.1180	0.1368	-0.0188	-0.2628(X2)
No. of Vehicles changed (X_5)	0.1471	0.0690	0.0781	0.0757(X1)
Change in Consumption of Kerosene(X_6)	-0.0955	-0.0573	-0.0382	0.0805(X13)
Change in Consumption of Petrol (X_7)	0.1292	0.1331	-0.0039	-0.1499(X2)
Changing Family Expenditure (X_8)	0.1310	0.0752	0.0558	-0.1731(X2)
Changing Expenditure Allocation on Farming (X_9)	-0.1248	-0.0120	-0.1128	-0.1517(X10)
Changing Expenditure Allocation on Education (X_{10})	0.3081	0.2682	0.0399	0.1230(X1)
Changing Expenditure Allocation on Health (X_{11})	0.1103	0.0474	0.0629	0.0631(X10)
Change in Listening to Radio (X_{12})	-0.0555	-0.0408	-0.0147	0.0806(X13)
Change in Watching T.V(X_{13})	0.0656	-0.1946	0.2602	-0.1005(X2)
Changing Interaction with Input Dealers (X_{14})	0.1007	0.1371	-0.0364	-0.0442(X15)
Changing Interaction with Extension Agent(X_{15})	0.0206	-0.0984	0.1190	0.0616(X114)
Change in Farm Size (X_{16})	0.1215	0.0308	0.0907	0.0862(X1)

Changing Cropping Intensity **(X_{17})**	-0.0499	-0.1388	0.0889	0.0340(X19)
Changing Cultivable Land **(X_{18})**	0.1394	-0.0284	0.1678	0.0826(X10)
Change in Fertilizer Application**(X_{19})**	-0.0494	0.1055	-0.1549	-0.0854(X1)

Table 34 shows the Path Analysis to depict the Total Direct Effect, Total Indirect Effect and Residual Effect of 19 exogenous variables on the consequent variable, Perceived Climate change effect on Agriculture (Y_{11}).

The table has elucidated that variable, Age (X_1), has exerted the Highest Direct Effect whereas variable, Education (X_2), has exerted Highest Indirect Effect on the consequent variable, Perceived Climate change effect on Agriculture (Y_{11}).

Young farmers are getting more impacted by the perceived climate change effect on agriculture. Due to their better education & better perception, they can efficiently recognise the effect of climate change on agriculture, while the elder farmers have failed to do so. Educated farmers feel the brunt effect of climate change on agriculture. They know the causes and effect of climate change and that's why they are adopting more modern and appropriate technologies to combat against the brunt of change dynamics. Relatively less literate farmers suffer loss due to climate change but they fail to perceive the climate change effect on agriculture due to lack of knowledge.

The variable, Age (X_1) has recorded the Highest Indirect Effect of 6 exogenous variables to characterise the consequent variable, Perceived Climate change effect on Agriculture (Y_{11}). So this variable has got tremendous companionship behaviour to characterize the consequent variable.

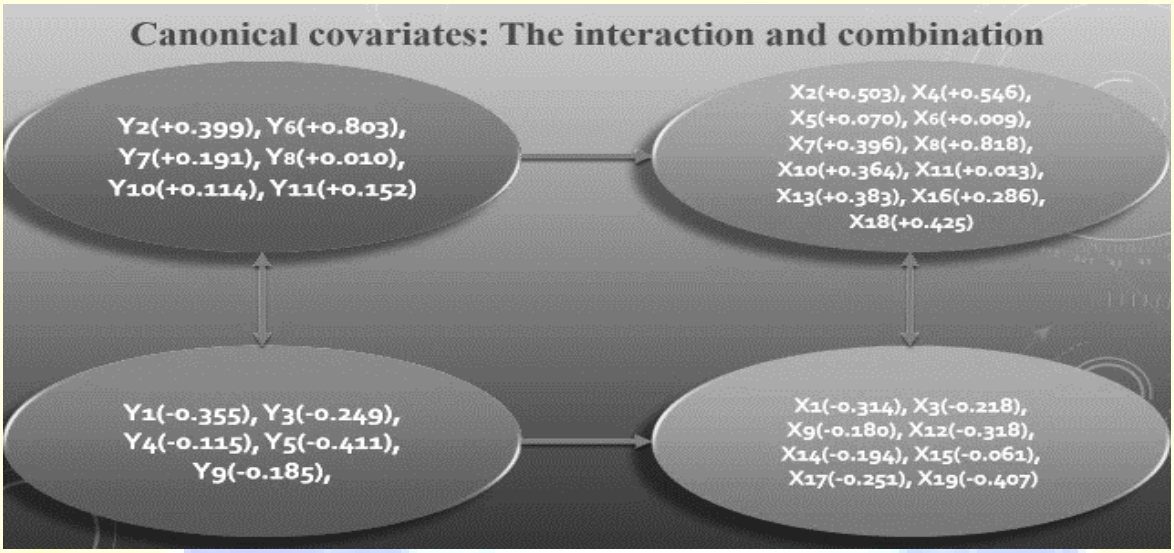
The Residual Effect being 0.7533, it is to conclude that even with combination of 19 exogenous variable,a huge portion of variance (75.33%) embedded with the consequent variable could not be explained. So, it would be more effective if more numbers of variable are included.

Canonical covariates: The interaction and combination

The model depicts that, from the left side (Set-I) variables (Y), the following consequent variables like, Change in Perceived effect of T.V. (Y_2), Change in Family income (Y_6), Change in Weed diversity (Y_7), Change in Crop Disease intensity (Y_8), Perceived Climate change effect (Y_{10}), **Perceived Climate change effect on Agriculture ($_{11}$)**, have shown clear choices toselect the following exogenous variables i.e. from the right sets of variables like, Education (X_2),

Family Education Status (X4), No. of Vehicles changed (X_5) , Change in Consumption of Kerosene (X_6), Change in Consumption of Petrol (X_7), Changing Family Expenditure (X8), Changing Expenditure Allocation on Education (X_{10}), Changing Expenditure Allocation on Health (X_{11}), Change in Watching T.V (X_{13}), Change in Farm Size (X_{16}), Changing Cultivable Land (X_{18}).

Model-1



The model shows that, at the first stage, the combination of consequent variables, Y_2, Y_6, Y_8, Y_{10}, Y_{11}, can be branded together as Climate Change Perception, that have selectively been ductile to the set of agricultural modernity variables (X_2, X_4, X_5, X_6, X_7, X_8, X_{10}, X_{11}, X_{13}, X_{16}, X_{18}), which again can be collectively branded as Agricultural Modernity and similarly, at the stage 2, the consequent variables like, Change in Perceived Effect of Radio (Y_1), Change in Perceived Effect of Input dealer (Y_3), Change in Perceived Effect of Extension agent (Y_4),Change in Productivity (Y_5), Change in Insect-pest intensity (Y_9), have shown clear choices to select the following exogenous variables i.e. from the right sets of variables like, Age (X_1), Family Size (X_3), Changing Expenditure Allocation on Farming (X_9), Change in Listening to Radio (X_{12}), Changing Interaction with Input Dealers (X_{14}), Changing Interaction with Extension Agent (X_{15}), Changing Cropping Intensity (X_{17}), Change in average fertilizer dose (X_{19}). It shows that. The combination of left side variables (Y_1, Y_3, Y_4, Y_5, Y_9) can be termed as Cosmopolite Information on Productivity Factor and have been ductile to the following set of

right side variables (X_1, X_3, X_9, X_{12}, X_{14}, X_{15}, X_{17}, X_{19}), which again can be branded as Family Resource and Interaction Character.

Table 7: Matrix Ranking: Participatory Perceptual Analysis on Dominant Problems Affecting Rural Life in Chilika Social Ecology

Attributes / Problems	No. of people affected	Severity of impact	Frequency of impact	Score	Rank
Irrigation	7	7	8	**22**	**2nd**
Disease-pest attack	6	6	7	**19**	**4th**
Low quality seeds	7	5	5	**17**	**5th**
Salinity	8	6	7	**21**	**3rd**
Climate Change	9	8	7	**24**	**1st**
Lack of knowledge	5	6	6	**17**	**5th**
Total	**42**	**38**	**40**	**120**	

The brunt of climate change is predominated, has been evinced in the participatory matrix ranking by local people. It has been found that the perceived effect of climate changes is the highest followed by lack of irrigation and salinity problem. This shows that, the natural networking of problems among three negative actors i.e. climate change, irrigation and salinity.

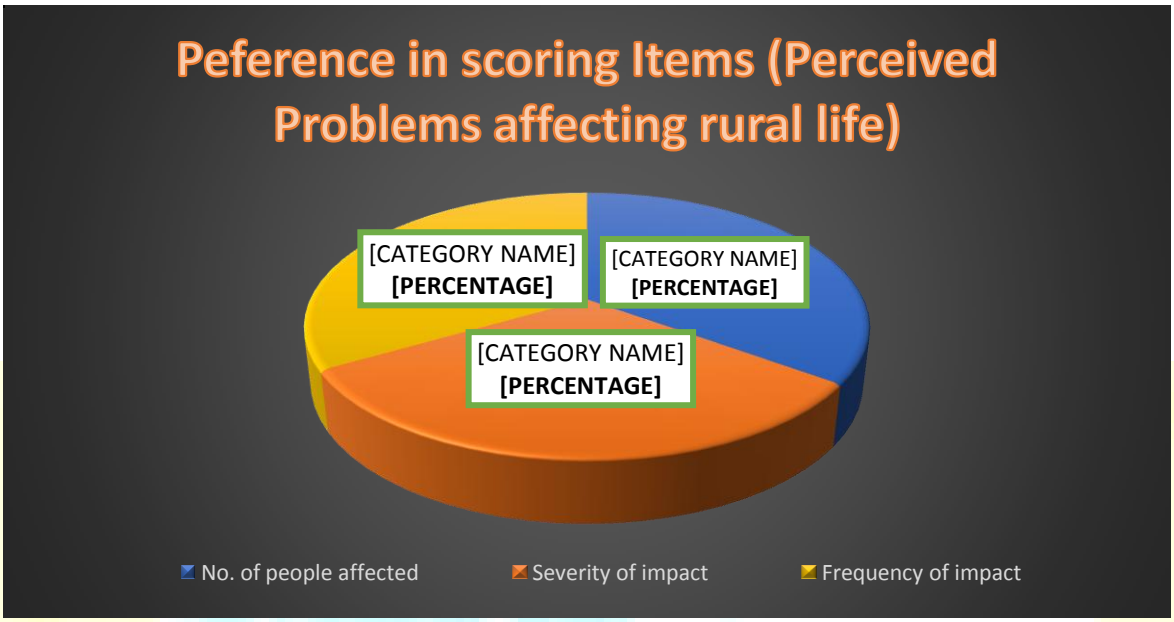


Table 8: Matrix Ranking: Participatory Perceptual Analysis on Choices and Ranking of Rice varieties

Attributes / Varieties	Production	Cooking quality	Scent	Disease-pest free	Climatic resistant	Profit	Total	Rank
Nadiarasa	3	6	6	4	3	4	**26**	**7th**
Tulasibasa	3	7	8	4	3	3	**28**	**5th**
Padmakeshari	2	5	6	3	3	2	**21**	**8th**
Ratantudi	5	5	5	3	4	5	**27**	**6th**
Narada	5	6	5	6	8	6	**36**	**2nd**
Masuri	8	7	5	7	6	8	**41**	**1st**
Swarna	7	6	4	5	6	6	**34**	**3rd**
1014	6	5	4	5	5	6	**31**	**4th**
Total	**39**	**47**	**43**	**37**	**38**	**40**		

In this participatory analytical process, the local people has selected 7 rice varieties grown in that area. The attributes are, Production, Cooking quality, Scented, Disease-pest free, Climatic resistant, Profit. It has been found that, the variety Masuri has splendidly combine production, profit, resilience to climate change and it has ranked the first position followed by Narada, Swarna etc. According to people perception, the variety Narada gives less production than Masuri, Swarna, 1014, but the variety has good resilience to climate change. That's why the variety Narada is so popular in coastal areas.

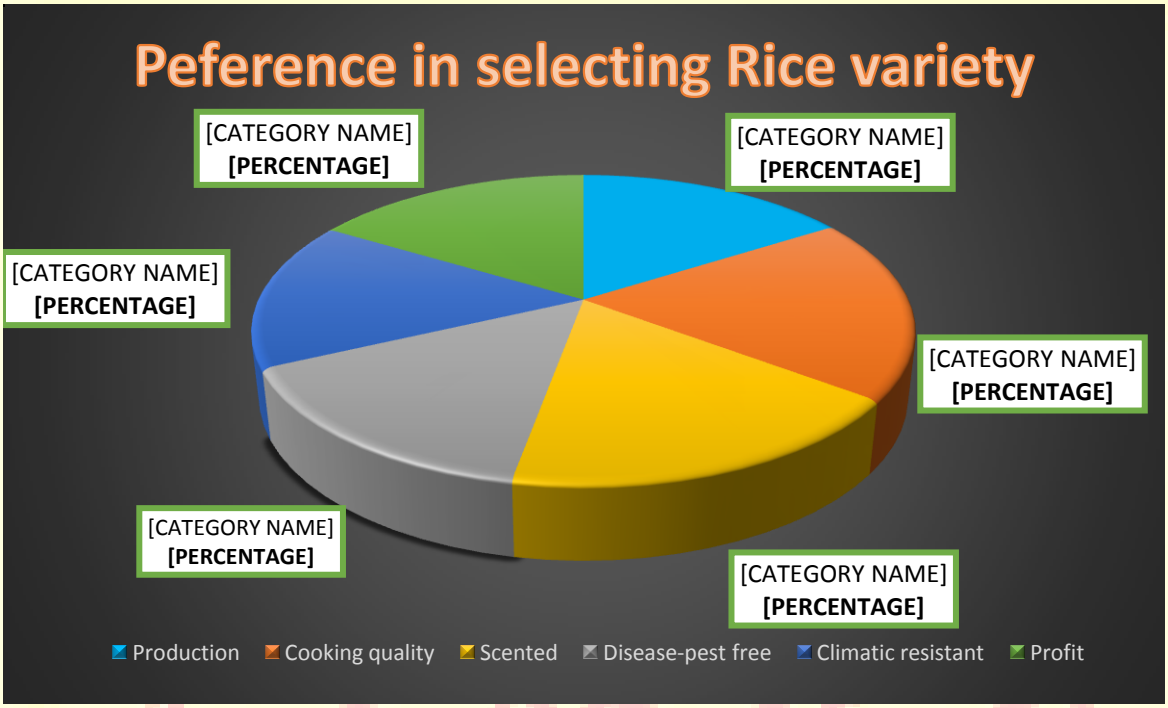


Table 9: Matrix Ranking: Participatory Perceptual Analysis on Causes of Environment Degradation

Attributes / Problems	No. of people affected	Severity of impact	Frequency of impact	Score	Rank
Deforestation	7	8	6	**21**	**1st**
Over-netting	6	6	7	**19**	**3rd**
Vehicles	5	6	6	**17**	**5th**

Population growth	5	8	7	**20**	**2nd**
Tourist pressure	4	4	5	**13**	**6th**
More Boats	5	6	7	**18**	**4th**
Total	**32**	**38**	**38**		

In this participatory analytical process, the local people have pointed out various problems lead to environment degradation like Deforestation, Over-netting, Vehicles, Population growth, Tourist pressure, More no. of Boats and ranked among them according to some attributes like, No. of people affected, Severity of impact, Frequency of impact. Deforestation is found as the main contributor towards environment degradation, followed by Population growth pressure, Over-netting, more no. of boats, etc.

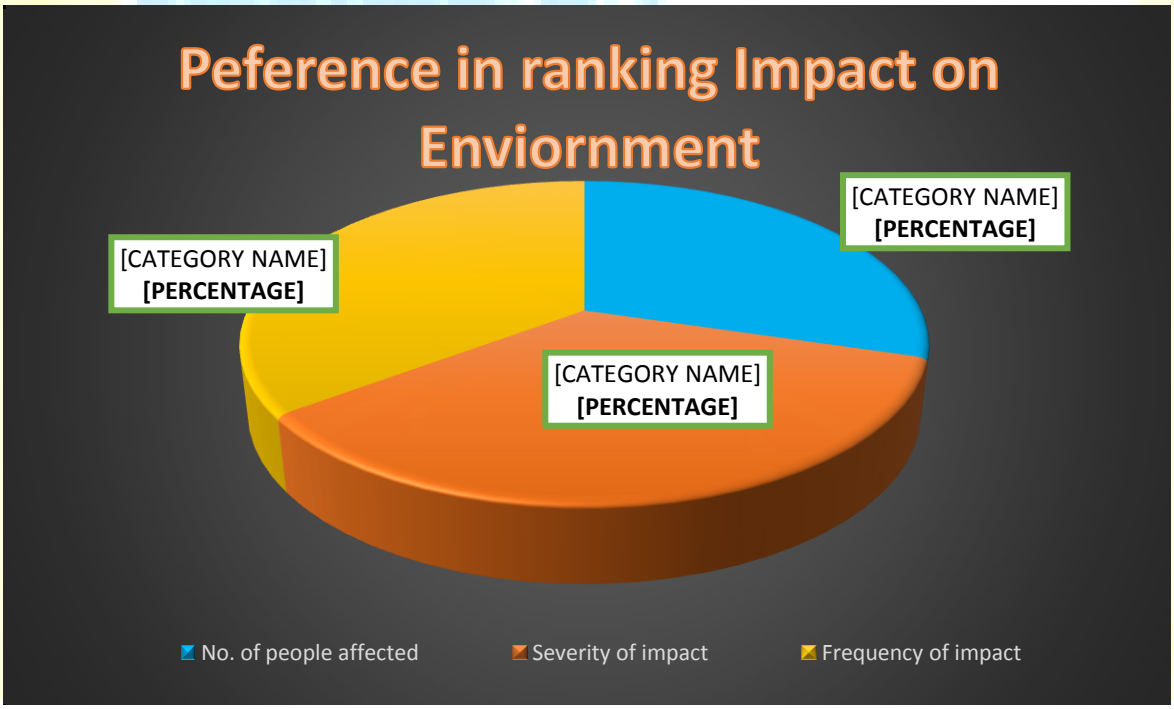


Table 10: Distribution of respondents according to perceived risks (N=80)

Risk	No.	Explanation	Rank
Increase in crop diseases	63 (78.75%)	There was increased phenomenon of certain type of disease, like- blast in seedbed of paddy,	**1**

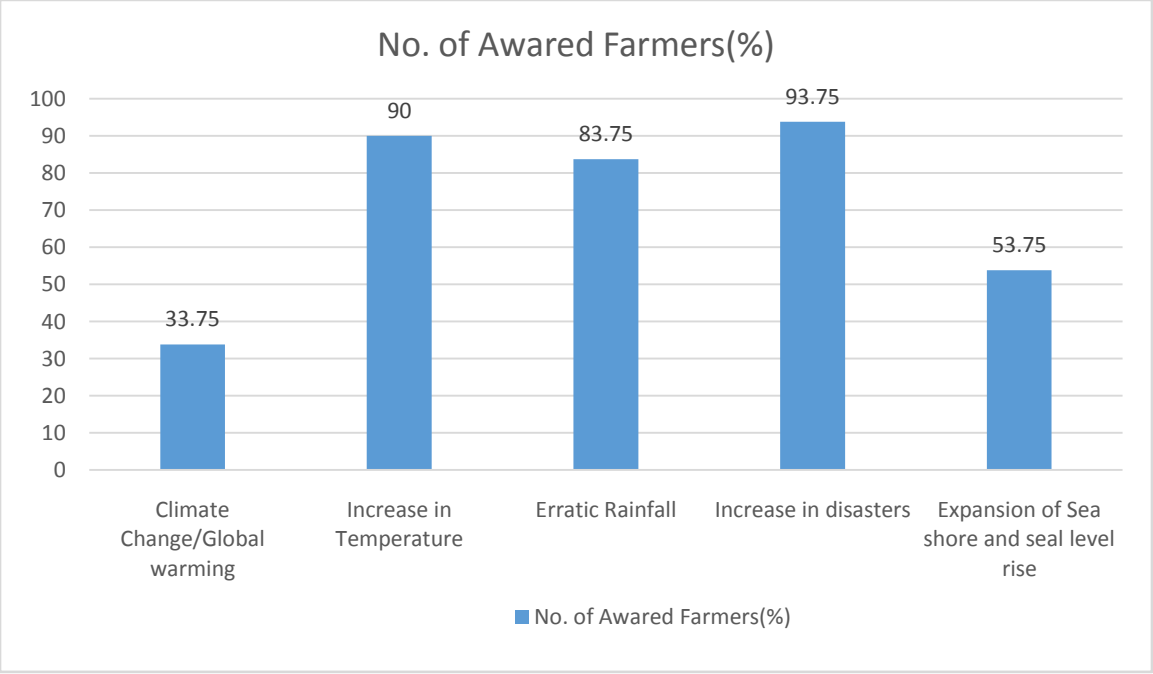
		yellowing of leaves, curling of leaves and rotting of seedlings etc. of different crops.	
Reduction in Agricultural production	47 (58.75%)	Reduction in yield of different Rabi crops due to high temperature and also Kharif paddy due to less rainfall	**6**
Increase in insect-pest attack	45 (56.25%)	Increase in the attack of different types of jassids and micro-incidences organisms.	**7**
Increase in incidence of salinity	52 (65%)	Due to sea level rising and increase in temperature, the problem of salinity is increasing to a significant extent. Increase in temperature leads toincrease in evaporation of water leaving dissolved salts at the surface soil, which in turn leads to increased problem of salinity.	**5**
Increase in coast of cultivation	60 (75%)	Due to increased pest and insect attack and also due to increased diseases costs of insecticide and fertilizer have also increased to a significant level.	**2**
Increase in animal diseases	45 (56.25%)	Different types of diseases of hen, duck, animals etc. like- white faeces, spot in the body, sterility etc. has increased.	**7**
Decrease in fish growth rate	37 (46.25%)	Growth rate of fish declined mainly due to overfishing and increased saline level.	**8**
Increase in cost of fish	54 (67.5%)	Now farmers have to move towards deep sea to catch fish which increase fish cultivation the both risk and cost of fish cultivation.	**4**
Decrease in forest area	58 (72.5%)	Area under mangrove forest has also declined due to deforestation and frequent disasters like cyclone.	**3**
Extinction of	30	Certain local animal and bird species has been	**10**

certain plants, birds and animal species	(37.5%)	totally vanished from that area.	
Decrease in Income	22 (27.5%)	Income of the farmers has reduced due to crop loss, low production and increase in cost of cultivation.	**11**
Increase in migration of people	35 (43.75%)	Peoples are migrating towards Bhubaneswar, Kolkata, Gujarat and Delhi etc. for job and better livelihood.	**8**

Table 47: Perception on Change dynamics(N=80)

Factors	No.	Rank
Climate Change/Global warming	27 (33.75%)	**5**
Increase in Temperature	72 (90%)	**2**
Erratic Rainfall	67 (83.75%)	**3**
Increase in disasters	75 (93.75%)	**1**
Expansion of Sea shore and seal level rise	43 (53.75%)	**4**

Graphical delineation:



People by less no. do believe that there is global warming or climate change. But, people in high intensity do believe that, there has been change in temperature, increase in disasters and rainfall has developed an erratic pattern. Still maximum farmers are not aware of climate change or global warming and its worst impact on their livelihood. So, global warming as rhetoric, may not be that socialized as such, but there has been a clear perception on changes of meteorological parameters.

Conclusion

The coastal agriculture Odisha has so far been the worstrecipient of the brunt of climate change. The inflicted areas are agriculture, fishery, public health, livestock health and as a whole the normal functioning of social ecology. The study, through a very complex interactional analysis has come to a conclusion that, the farmer respondents having better education, higher size of holding and better expenditure allocation have become a better predictor of the brunt of climate change.Still maximum farmers are not aware of climate change or global warming and its worst impact on their livelihood while they have felt the irregularized rainfall and higher temperature. Young farmers are getting more impacted by the perceived climate change effect on agriculture. When education status goes up and village school teacher as well as farmerentrepreneurs are becoming more concerned about the impact of climate change. So, these educated rural mass, who are also associated with farming, can play the pivotal in creating the greater awareness among the common people and also can mobilize small activist group to act as climate manager rather than the owner of land in combating this impending danger.

References

Acharya, S. K., Bera, S. (2012). Social ecology of Tea gardens in India: Perspective of global warming. LAP LAMBERT Academic Publishing.

Intergovernmental Panel on Climate Change (IPCC). (2007). Climate Change 2007: Impacts, Adaptation, and Vulnerability. Fourth Assessment Report.

Nadaoka, K. (2005). Coastal ecosystems response to climate change and human impact in the Asia-Pacific region (CERCCHI project), pp.411-420.

Organisation for Economic Co-operation and Development (OECD). (2002). Climate change: India's perceptions, positions, policies and possibilities.

Roy, T. N. (2012). Economic Analysis of Producers' Perceptions about Impact of Climate Change on Fisheries in West Bengal. Agricultural Economics Research Review, Vol. **25**(No.1), pp 161-166.