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Farmers' Perceptual Analysis on Change Dynamics of Effectiveness of Extension Agent in Agriculture

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ABSTRACT

Agricultural extension and advisory services play an important role in addressing the burning challenges of modern agriculture. The present study has delved deeper and also envisaged the perceptual and situational analysis of change dynamics of effectiveness of extension agent by taking 19 independent variables and dependent variable, change in perceived effect of extension agent (Y4) on the basis of decadal observation from 1984 to 2014. The result shows that, the variables like, Change in Watching T.V (X13), Change in Consumption of Kerosene (X6), Changing Interaction with Extension Agent (X15), Change in average fertilizer dose (X19), all have significant correlation and contributed variance to the consequent variable. Result shows that interaction with extension agent and change in fertilizer application, have made a socio-operational diode to estimate change dynamics as recorded by extension agent. Results also found that majority (53.75%) of the respondents had no contact with the extension agents, while 40 per cent were visited rarely (3 – 6 times per year). About 10.23 per cent had contact often or monthly while only 12.5 per cent had contact very often (fortnightly or more) in a year with extension agent which shows the inefficiency of agricultural public extension system.

Keywords : Agriculture, change dynamics, extension agents, fertilizer dose, perception

INTRODUCTION

The upsurging issues of extension science are increasingly focusing on the aspects of social ecology along with its transformation in the technology socialisation process. Every ecosystem has got its own structural and functional constructs, which are in constant interaction and exchange with each other. The transforming extension paradigm is keeping up with structural issues, while the functional components are entirely in constant dynamics in the space retained by the structure, and that's why, without ecological paradigm, no such interaction can be elucidated or estimated. Agricultural extension and advisory services play an important role in addressing this challenge. Agricultural extension services play a pivotal role in ensuring that the farmers have access to improved and proven technologies and that their concerns and needs are properly addressed by relevant service providers.

However, the role of extension today goes beyond technology transfer to facilitation; beyond training to learning, and includes assisting farmer to form groups, dealing with marketing issues, addressing public interest issues in rural areas such as resource conservation, health, monitoring of food security and agricultural production, food safety, nutrition, family education, and youth development and partnering with a broad range of service providers and other agencies (USAID, 2002). To Seevers *et al* (2007), future extension professionals need to be more skillful and futuristic to serve the needs of diverse audience. Extension staff must learn new knowledge and skills, since it is only knowledgeable and skillful individual who can play a vital role in the success of an organisation in today's technological environment. According to Agbamu (2005), sequel to the food situation in many developing societies, which are predominantly agrarian, finding how to raise productivity among the rural poor in these countries has become one of the two or three most urgent questions confronting the international development community today. Agricultural development implies a shift from traditional methods of production to new, science- based methods of production that include new technological components, such as new varieties, cultural practices, commercial fertilizers and pesticides as well as new crops and new farming systems (Madukwe and Erie, 1999). Njoku (1990) opined that institutional inefficiencies in the development and delivery of relevant information and assistance from national extension systems are often the major reasons why farmers do not adopt farming innovations.

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METHODOLOGY

A structured questionnaire was used to elicit information from a sample size of 80 farmers randomly selected from 4 villages of two block. Data were collected through questionnaire method on various independent variables Table 1 and data on dependent variable were collected through questionnaire method in 1-10 rating scale from 80 respondents. Respondents rated the effect of extension agent on them in 1980-1990 and 1990-2000 and 2000-2010 on decadal basis through their perception. Then changes in perceived effect between consecutive decade has been determined and mean perceived effect rating scores were calculated of all respondents individually.

Table 1: Explain something about the reason for purposive selection & sampling scheme adopted?

Items	Level	Approach
State	Odisha	Purposive
District	Puri	Purposive
Block	Krushnaprasad, Brahmagiri	Purposive
Village	Malud, Satapada, Brahmagiri, Bentapur	Random
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 Involved 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. coefficient of Correlation 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 were carried out. Change in variables referred to change from 1984 to 2014 on the basis of decadal observation.

Table 2: Independent Variables

Variables	Notation	Score
Age	X_1	Chronological age
Education	X_2	Years of Schooling
Family Size	X_3	Number of family members
Family Education Status	X_4	Year of Schooling/Family
No. of Vehicles changed	X_5	In No.
Change in Consumption of Kerosene	X_6	Litre/month/family
Change in Consumption of Petrol	X_7	Litre/month/family
Changing Family Expenditure	X_8	Rupees/Month/Family size
Changing Expenditure Allocation on Farming	X_9	1-100 Scale
Changing Expenditure Allocation on Education	X_{10}	1-100 Scale
Changing Expenditure Allocation on Health	X_{11}	1-100 Scale
Change in Listening to Radio	X_{12}	In hours/month
Change in Watching T.V	X_{13}	In hours/month
Changing Interaction with Input Dealers	X_{14}	In hours/month
Changing Interaction with Extension Agent	X_{15}	In hours/month
Change in Farm Size	X_{16}	Holding/ Family size (ha.)
Changing Cropping Intensity	X_{17}	In %
Changing Cultivable Land	X_{18}	In ha.
Change in Fertilizer Application	X_{19}	Kg/Ha.

Dependent Variable: Change in Perceived effect of Extension agent (Y4)-It refers to change in perceived effect of Extension agent from 1984-2014 on decadal basis and evaluated by 1-10 point scale by farmers.

RESULTS AND DISCUSSION

Results: Variables, Change in Watching T.V (X13), Changing Interaction with Extension Agent (X15), and Change in average fertilizer dose (X19), have been found to have strong positive correlation with dependent variable, Change in Perceived Effect of Extension agent (Y4).

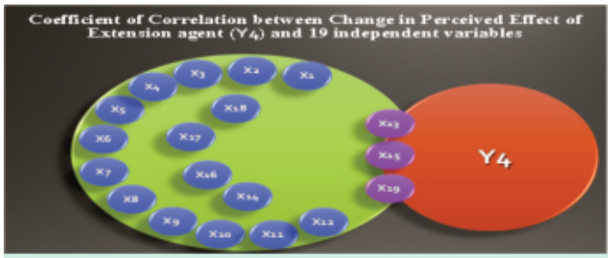
Revelation: People with cosmopolite nature are highly impacted by extension agent in relation to perceiving change pattern. To fulfill the demand by increasing the production, new technologies are to be informed regularly. Day by day increased meeting of television and interaction with extension agent, have made people more cosmopolite. Higher cosmopolite nature leads to gradual increase in perceived effect of extension agent in relation to changing time. Higher fertilizer application refers to more input investment which need more consultation with the resource person *i.e.* extension agent that will minimize their risk. So, progressive farmers are highly impacted by the extension agent through acquiring required learning experiences. Interaction with extension agent and change in fertilizer application, have made a socio-operational diode to estimate change dynamics as recorded by extension agent.

Table 3: Coefficient of Correlation(r): Change in Perceived Effect of Extension agent (Y4) vs 19 independent variables

Variables	R value	Remarks
Age (X_1)	0.0042	
Education (X_2)	0.0263	
Family Size (X_3)	0.1079	
Family Education Status (X_4)	0.0284	
No. of Vehicles changed (X_5)	0.1265	
Change in Consumption of Kerosene (X_6)	-0.1505	
Change in Consumption of Petrol (X_7)	0.0318	
Changing Family Expenditure (X_8)	-0.0367	
Changing Expenditure Allocation on Farming (X_9)	0.0343	
Changing Expenditure Allocation on Education (X_{10})	-0.0154	
Changing Expenditure Allocation on Health (X_{11})	-0.0186	
Change in Listening to Radio (X_{12})	0.0122	
Change in Watching T.V (X_{13})	0.3183	**
Changing Interaction with Input Dealers (X_{14})	0.1735	
Changing Interaction with Extension Agent (X_{15})	0.5060	**
Change in Farm Size (X_{16})	-0.0142	
Changing Cropping Intensity (X_{17})	0.0160	
Changing Cultivable Land (X_{18})	0.0664	
Change in Fertilizer Application (X_{19})	0.4944	**
r>0.220 significant at p=0.05(*)		
r>0.287 significant at p=0.01(**)		

The Data Table 3 presents the coefficient of correlation between Change in Perceived Effect of Extension agent (Y4) and 19 independent variables.

Model-1



X13-Change in Watching T.V, X15-Changing Interaction with Extension Agent, X19-Change in average fertilizer dose.
Y4- Change in Perceived Effect of Extension agent

Table 4: Regression analysis: Change in Perceived effect of Extension agent (y4) vs 19 causal variables (X1-X19) Multiple R sq.- 0.4845

Variables	Beta	Beta x R	Reg. coef. B	S, error B	t value
Age (X_1)	0.004	0.004	0.001	0.016	0.034
Education (X_2)	-0.018	-0.096	-0.005	0.051	0.105
Family Size (X_3)	0.068	1.519	0.040	0.073	0.553
Family Education Status (X_4)	0.026	0.151	0.014	0.098	0.143
No. of Vehicles changed (X_5)	0.051	1.336	0.075	0.178	0.419
Change in Consumption of Kerosene (X_6)	0.099	-3.061	0.101	0.137	0.739
Change in Consumption of Petrol (X_7)	-0.087	-0.572	-0.010	0.017	0.613
Changing Family Expenditure (X_8)	-0.049	0.372	0.000	0.000	0.302
Changing Expenditure Allocation on Farming (X_9)	-0.088	-0.623	-0.010	0.015	0.690
Changing Expenditure Allocation on Education (X_{10})	-0.149	0.474	-0.022	0.021	1.090
Changing Expenditure Allocation on Health (X_{11})	0.060	-0.230	0.013	0.024	0.561
Change in Listening to Radio (X_{12})	0.126	0.318	0.005	0.004	1.131
Change in Watching T.V (X_{13})	0.349	22.908	0.018	0.007	2.692
Changing Interaction with Input Dealers (X_{14})	-0.119	-4.245	-0.071	0.073	0.970
Changing Interaction with Extension Agent (X_{15})	0.343	35.846	0.165	0.060	2.748
Change in Farm Size (X_{16})	-0.017	0.050	-0.071	0.549	0.130
Changing Cropping Intensity (X_{17})	-0.107	-0.351	-0.005	0.005	1.006
Changing Cultivable Land (X_{18})	0.163	2.239	0.297	0.281	1.057
Change in Fertilizer Application (X_{19})	0.431	43.960	0.022	0.006	3.554

The table 4 presents the Regression Analysis to estimate the causal effects of 19 exogenous variables on the respective consequent variable, Change in Perceived effect of Extension agent (Y4).

Result: It has been found that, two variables, Changing Interaction with Extension Agent (X15), Change in Fertilizer Application (X19), have recorded substantive impact on Change in Perceived effect of Extension agent (Y4), respectively contributed 43.96 per cent & 35.85 per cent of variance in Change in Perceived effect of Extension agent (Y4).

Revelation: Change pattern in fertilizer use and change in interaction with extension agent have contributed in generating perception on change pattern recorded by extension agent. Increasing fertilizer use leads to more investment which make farmer more protective with respect to climate change scenario. The R-sq. value is 0.4845 which implies that with the combination of 19 exogenous variables, 48.45 per cent of variance is embedded with consequent variable *i.e.* Change in Perceived effect of Extension agent (Y4).

Step-down Regression analysis Multiple R sq.= 0.4007

Variable	Beta	t-value
Change in Watching T.V (X_{13})	0.214	2.279
Changing Interaction with Extension Agent (X_{15})	0.292	2.856
Change in Fertilizer Application (X_{19})	0.374	3.850

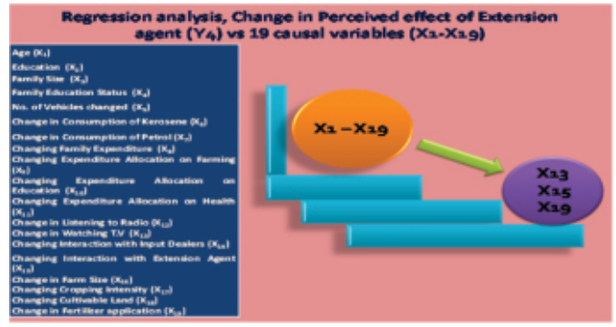


Table 5: Path Analysis: Direct, Indirect and Residual effect; Change in Perceived Effect of Extension agent (Y4) Vs 19 Exogenous Variables.Residual effect=0.5155

Variables	Total Effect (r)	Direct Effect (DE)	Indirect Effect (IE)=r-DE	Highest Indirect Effect
Age (X_1)	0.0042	0.0044	-0.0002	-0.1044(X13)
Education (X_2)	0.0263	-0.0177	0.0440	0.1040(X13)
Family Size (X_3)	0.1079	0.0682	0.0397	0.1162(X19)
Family Education Status (X_4)	0.0284	0.0257	0.0027	0.1166(X13)
No. of Vehicles changed (X_5)	0.1265	0.0512	0.0753	0.1169(X13)
Change in Consumption of Kerosene (X_6)	-0.1505	0.0986	-0.2491	-0.1442(X13)
Change in Consumption of Petrol (X_7)	0.0318	-0.0871	0.1189	0.1134(X13)
Changing Family Expenditure (X_8)	-0.0367	-0.0491	0.0124	0.0866(X18)
Changing Expenditure Allocation on Farming (X_9)	0.0343	-0.0879	0.1222	0.0842(X10)
Changing Expenditure Allocation on Education (X_{10})	-0.0154	-0.1489	0.1335	0.1022(X13)
Changing Expenditure Allocation on Health (X_{11})	-0.0186	0.0598	-0.0784	-0.0350(X10)
Change in Listening to Radio (X_{12})	0.0122	0.1264	-0.1142	-0.1445(X13)
Change in Watching T.V (X_{13})	0.3183	0.3488	-0.0305	0.1085(X15)
Changing Interaction with Input Dealers (X_{14})	0.1735	-0.1185	0.2920	0.1543(X15)
Changing Interaction with Extension Agent (X_{15})	0.5060	0.3433	0.1627	0.1102(X13)
Change in Farm Size (X_{16})	-0.0142	-0.0169	0.0027	0.0939(X18)

Changing Cropping Intensity (X_{17})	0.0160	-0.1066	0.1226	0.1389(X19)
Changing Cultivable Land (X_{18})	0.0664	0.1635	-0.0971	-0.0722(X19)
Change in Fertilizer Application (X_{19})	0.4944	0.4308	0.0636	0.1343(X15)

Table 5 explains the Path Analysis to depict the Total Direct Effect, Total Indirect Effect and Residual Effect of 19 exogenous variables on the consequent variable, Change in Perceived Effect of Extension agent (Y4).

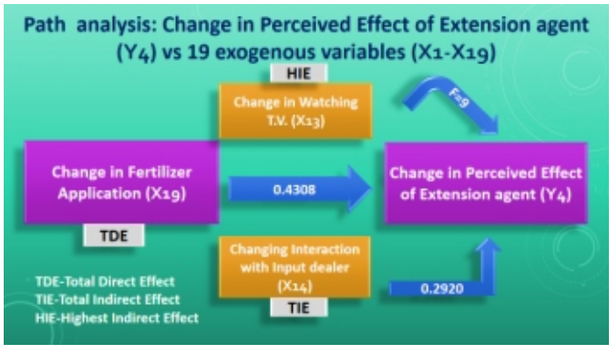
Variable, change in fertilizer application (X19), has exerted the highest direct effect while changing interaction with input dealers (X14), has exerted the highest indirect effect. With change in fertilizer use, the change in perceived effect of extension agent with respect to change pattern, changes. Change in interaction with input dealer has the highest indirect effect on changing effect of extension agent.

Aware and risk taking farmers are applying more fertilizer to increase their production as they have better link with extension agent for effective farming. Better linkage with extension agent has shown increase in fertilizer application in a positive direction. So, cosmopolite people are getting largely impacted by the effect of extension agent on the perception of change dynamics.

The variable, Change in Watching T.V (X13), finds maximum no. of indirect effect i.e. 9 times on the resultant variable, Change in Perceived Effect of Extension agent (Y4) which refers that more contact with extension agent widens the outlook of farmers towards modern agriculture.

The residual effect is 0.5155, it is to conclude that even with the combination of 19 exogenous variables, 51.55 per cent of variance embedded with consequent variable, Change in Perceived Effect Extension agent (Y4), couldn't be expressed.

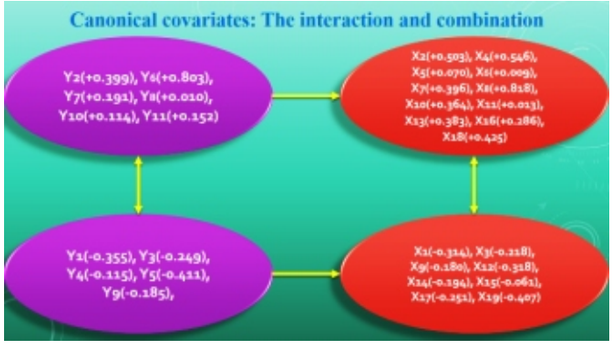
Model-3



Canonical covariates: The interaction and combination

Canonical covariate analysis has been carried out to depict the clandestine interaction and combination between two sets of variable i.e. Left and Right sets of variables. This analysis has got tremendous strategic importance.

Model-4



The model shows that, at the first stage, the combination of consequent variables, Y2, Y6, Y8, Y10, Y11, can be branded together as Climate Change Perception, that have selectively been ductile to the set of agricultural modernity variables (X2, X4, X5, X6, X7, X8, X10, X11, X13, X16, X18), which again can be collectively branded as Agricultural Modernity similarly, at the stage 2, the consequent variables like, Change in Perceived Effect of Radio (Y1), Change in Perceived Effect of Input dealer (Y3), Change in Perceived Effect of Extension agent (Y4), Change in Productivity (Y5), Change in Insect-pest intensity (Y9), have shown clear choices to select the following exogenous variables i.e. from the right sets of variables like, Age (X1), Family Size (X3), Changing Expenditure Allocation on Farming (X9), Change in Listening to Radio (X12), Changing Interaction with Input Dealers (X14), Changing Interaction with Extension Agent (X15), Changing Cropping Intensity (X17), Change in average fertilizer dose (X19). It shows that. The combination of left side variables (Y1, Y3, Y4, Y5, Y9) can be termed as Cosmopolite Information on Productivity Factor and have been ductile to the following set of right side variables (X1, X3, X9, X12, X14, X15, X17, X19), which again can be branded as Family Resource and Interaction Character.

Perception of Extension Agents' Effectiveness

Majority (53.75%) of the respondents had no contact with the extension agents, while 40 per cent were visited rarely (3 – 6 times per year). About 10.23 per cent had

contact often or monthly while only 12.5 per cent had contact very often (fortnightly or more) in a year with extension agent.

Table 6: Percentage distribution of respondents according to contact with extension agents

n=80

Interaction with Extension Agents (per year)	Percentage (%)
Never (zero contact per year)	53.75
Rarely(3-6 contact per year)	40
Often (monthly)	18.75
Very often (fortnightly)	12.5

The frequency of contact is low and shows that extension agents were not visiting the farmers adequately, implying inefficiency of the agricultural extension system. The low frequency of contact between extension agents and farmers might have been due to lack of funds or inadequacy of extension agent numbers.

CONCLUSION

Result shows that interaction with extension agent and change in fertilizer application, have made a socio-operational diode to estimate change dynamics as recorded by extension agent. Progressive farmers having greater cosmopolite nature have greater contact with extension agents. It is found that farmers having frequent interactions with extension agents were more influenced by extension agents which lead to their improvement in economic condition and ultimately standard of living. Frequent contacts with extension agent improves the farmers' knowledge about the modern innovative technologies and by gaining access to those they are adopting modern agricultural practices in contrast to other farmers who have lesser contact with extension agents. The study also revealed some weakness of extension agents in areas such as inadequate frequency of contact with farmers, inadequate communication skills and knowledge of adult learning principles. This implies that agricultural extension agents are not at the fullest potentials of their effectiveness which have been the characteristic of public agricultural extension service. The low frequency of contact between extension agents and farmers might have been due to lack of funds or inadequacy of extension agent numbers on which government.

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