

Estimation of perception on discontinuance to measure social entropy in a farm ecology: A global perspectives

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ABSTRACT

Social entropy is a serious problem in social system in India. Farmers are often and then imposed with the technology and it is creating resentment among them after adopting for some periods because of non suitability to their sustainable livelihood situation. Discontinuance of conventional practices is not new now a day. Often and then farmers are discontinuing the traditional technology to welcome new technology. When farmers' desires are unmet, when they are fatigued with the old practices, it creates a kind of social entropy in a social system. Social entropy is a kind of disorder or chaos in social system which is visible by the negative cognitive behaviour of the farmers. Ex post facto design of research method was conducted in two villages namely Ghoragacha in West Bengal and Chiroura in Bihar. Marketing orientation (x26), Adoption leadership (x17), Family Education status(x3), Utilization of cosmopolite source of information(x28) and Economic motivation (x22) have been found to cause the discontinuance of the conventional farming practices. Coefficient of correlation, Stepwise regression analysis, path analysis was used for the analysis of data collected from 150 farmers and ultimately to understand the dictum of social entropy which are transforming our social ecology. Social entropy to social ecology, can address the social responsibility at the same time by sustaining the livelihood of the millions of famers in our country.

Keywords: Chaos, disorder, farm modernization, farm technology, motivation

Discontinuance is an aberrant social phenomenon of farmers. According to Rogers (2003) discontinuance is defined as a decision to reject and innovation after having previously adopted it. The present study estimate the perception on discontinuance about the prescribed technology with respect to why and in what situation farmers show negative cognitive behavior as discontinuance. Discontinuance generates entropy in the information flow and information socialization process in any social ecology. A social ecology is basically a structural arrangement or social anatomy wherein the social process are being conducted and organized. Any social function *vis-a-vis* social process must have to have energy equivalence may be in the form of motivation, emotion or psychological drive. Here, discontinuance as a 'contra social process' has been conceived to have added some jerk of energy release or energy imbalances in a given farming systems, here conceived as a kind of social entropy in an agrarian system.

Rural social movements have in recent years adopted agro-ecology and diversified farming systems as part of their discourse and practices. Entropy has the potential to be one of the most important generic concepts available for linking theory and research on all life support systems. All life support systems, in order to be sustainable, must possess sufficient levels of energy and information. However, merely having available energy and information is not enough for sustainable life support. This energy must be used

effectively to do work; with the end result that the entropy is not permitted to rise to uncomfortable levels according to Bailey (1994). Social entropy is a serious problem in social system in India also. Farmers are often and then imposed with the technology and it is creating resentment among them after adopting for some periods because of non suitability to their sustainable livelihood situation.

The history of Agricultural Extension Education in India has predominantly being with a production bias, as if every Indian farmer is all set to adopt institutional prescription without question. Non adoption was treated as a failure on the part of farmer per se, the discipline suffers conspicuously a realistic research as to why and how the farmers discontinue or reject the prescribed technology. Discontinuance as process, if analyzed critically, can provide an alternative outlook for generating 'appropriate technology' rather than modern technology. Appropriate technology is "technology appropriate to a country's factors of production in that it maximizes the use of factors which are locally plentiful and minimizes the use of those which are locally scarce." (Bonanno, 1989) Globalization calls for the necessity of finding the way to social ecology. Economic life, cultural life and rights life are the basic social quality. Social ecology refers to the interacting relations between human beings and their institutions at global or local level in their multiple forms such as government institutions, school, NGOs etc. 20 per cent of world population is living with less than

US\$1/day. 4 billion of the 6.1 billion world population is living below the poverty line. The difference between the richest 20 per cent and the poorest 20 per cent in the world was 11 times in 1913, 30 times in 1990, 72 times in 1998. 20 per cent of the world population owns now 86 per cent of the world income. UN estimates that 0.6 per cent of the world's early GDP would be necessary to provide access for all the basic education, health, family planning and food. Still 11 million of children die each year around the world (30000/day= 6 world trade center's) by health and nutritional reasons that could easily be prevented. While US\$ 750 billion is spent on weaponry each year, 26 per cent of the original would forest would remain and about 10000 species of plants and animals are extinguished each year. This reveals that something is out of order in the social order of the world. Therefore, all efforts to revert this situation will be powerless to detain this process of social entropy. Unless we reach the root of it, to find a way to sustainable development from social point of view a way to social ecology.

Kwon and Zmud (1987) suggested that social factors could influence intention to discontinue. They defined social factors in terms of social approval and communication about innovations. Parthsarthy (1995) further elaborates many innovations are used directly after adoption but then fade from use as these technologies are adopted or the individual's priorities shift. Fashions, fads and impulse buys are likely to suffer from under utilization. Sar Caren Grown and Timothy Bates (1991) the youngest owners are less likely to survive, but growing older is related to survival in a non linear fashion being very old is associated with firm discontinuance (likely due to retirement of sale). Examination of the raw discriminant function coefficients indicates, for example, that black owners in their late 40s are the ones whose business are most likely to remain active; beyond owner age 60, discontinuance increases rapidly. Rogers (2003) reported two types of discontinuance which can be replacement discontinuance that is rejected an idea in order to adopt a better one that supersedes it or disenchantment discontinuance where a discussion to reject an idea as result of dissatisfaction with its performance. Alexander et al (2002) and Darr and Chern (2002) described discontinuance among farmers who previously adopted genetically modified crops by Ohio farmers as disadopters. The present investigation was carried out with the following objectives.

1. To identify some, socio-psychological and agro-economic factors responsible for perception on discontinuance regarding prescribed technology.

2. To establish intra and inter relationship among the identified socio-economic, socio-psychological and agro-economic variables influencing Perception on discontinuance among the respondent.
3. To isolate some factors contributing to Perception on discontinuance among the respondents.
4. To estimate perception on discontinuance among the respondents for prescribed technology.

MATERIALS AND METHODS

Ex post facto design of research method was conducted in two villages namely Ghoragacha in West Bengal and Chiroura in Bihar. Coefficient of correlation, Stepwise regression analysis, path analysis was used for the analysis of data collected from 150 farmers. Data were collected through face to face interview with the help of structured interview schedule. The independent and dependent variables for investigation are cited in table-1. Social Entropy was estimated using the following formula.

$$\text{Social Entropy}(Y) = \frac{y1 + y2 + y3 + y4 + y5 + y6 + y7}{7}$$

Data were subjected to statistical analysis like, coefficient of correlation; stepwise regression and path analysis.

RESULTS AND DISCUSSION

Revelation

Table-1 presents the coefficient of correlation between Perception on discontinuance (y1) and 32 exogenous variables. The table reveals that following variables viz. cropping intensity (x9); expenditure allotment (x11), adoption leadership (x17), innovation proneness (x20), risk orientation (x21), market orientation (x26), utilization of cosmopolite source of information (x28); information seeking behaviour (x29) and distance matrix (x31) have been highly significantly and positively correlated with the dependent variable perception on discontinuance (y1).

The table also reveals that the following variables viz., education (x2), family education status (x3), education aspiration (x4) and farm size (x10) have been highly significantly but negatively correlated with the dependent variable perception on discontinuance (y1).

It has also been found that the variables viz., electricity consumption (x14); orientation towards competition (x23) and management orientation have been significantly and positively correlated with the dependent variable, perception on discontinuance (y1).

Table 1: Correlation coefficient between perception on discontinuance (y1) and 32 independent variables

Variables	Correlation coefficient (r)
Age (x1)	-0.138
Education (x2)	-0.366**
Family education Status (x3)	-0.248**
Educational aspiration (x4)	-0.252**
Family size (x5)	-0.115
Gender (x6)	-0.040
Urbanization index (x7)	-0.110
Occupation (x8)	-0.045
Cropping intensity (x9)	0.225**
Farm size (x10)	-0.398**
Expenditure allotment (x11)	0.235**
Credit load (x12)	0.009
Annual income (x13)	0.091
Electricity Consumption (x14)	0.172*
Fuel consumption (x15)	0.070
Irrigation index (x16)	0.104
Adoption leadership (x17)	0.393**
Scientific orientation (x18)	0.040
Independency (x19)	0.116
Innovation proneness (x20)	0.240**
Risk orientation (x21)	0.226**
Economic motivation (x22)	-0.069
Orientation towards competition (x23)	0.203*
Management orientation (x24)	0.208*
Production orientation (x25)	0.068
Market orientation (x26)	0.589**
Social participation (x27)	0.026
Utilization of cosmopolite source of information (x28)	0.309**
Information seeking behavior (x29)	0.347**
Training received (x30)	0.007
Distance matrix (x31)	0.317**
Drudgeries (x32)	0.054

Note: N = 150, *, ** Significant at 0.05 and 0.01% level of significance, respectively

Implication

It has been implicated that the farmers with poor education have discontinued the prescribed agricultural practices. Things need to be further analyzed to derive the conclusion that whether, collective family education has better and additive role for the continuity of the agricultural practices. It has also been discernible that respondent with lesser educational aspiration have also failed to continue the technology. Education is the most important cultural polymer that helps transformation through both gainful adoption and logical extension of technology choice, can be in the domain of agricultural or elsewhere.

Cropping intensity (x9) a variable that accounts for inclusion of more number of crop enterprises in a unit area of land, has helped the research to conclude that discontinuance is higher where entry of crops in a given unit of land higher also. It presents that in order to increase the entry of

new crops the exit of crop *vis a vis* discontinuance of conventional crops is also must. It is just like a *redox* process. Adoption is always preceded by rejection and the whole process can be read as progress of reoption. Reoption is an in-between social phenomenon of adoption and rejection. According to Acharya *et al.* (2008), one adopts an innovation at a point where he rejects the preceding one or one rejects an innovation so as to accommodate the succeeding innovation. Following the “*Redox*” (reduction-oxidation) reaction, we can resolve the bipolar nature of the process into a single hybridized concept as “*Reoption*” (rejection-adoption).

The negative and high correlation of farm size with discontinuance helps the researcher conclude that the phenomenon of ‘compulsion discontinuance’ can be high for poorer farmers. Here discontinuance has been not by choice but by compulsion.

Expenditure allotment has also helped to take a decision for discontinuance on the other hand a failure to allot expenditure after high value 'technology basket' can be reason for discontinuance of the same.

It is discernible from the correlation that the farmers tends to discontinue technology, are also characterize with consuming higher amount of electricity so, farmer having higher elements of urbanization amenities, are also an experimental of new venture to discontinue to traditional practice, so also has been reflected in the relation between adoption leadership and discontinuance.

Innovation proneness, risk orientation, orientation towards competition, market orientation all is representing a risk bearing prophesy and readiness of the farmers' respondents. The farmers from both the local pertaining to West Bengal and Bihar have bestowed that discontinuance tendency has been higher than those who dare to expose through a known investment for a future courage to gain an unknown return.

The communication variable utilization of cosmopolite source of information, information seeking behaviour and distance matrix all has helped inculcates the trend of the propensity of

discontinuance into the behavioural complex of the farmers of both West Bengal and Bihar.

The whole of the episode generated from the structure of correlation matrix shows that discontinuance cannot be seen only in a negative manner. It is really exciting to see that for the same eventuality of discontinuance there are slices of differential interpretation. Even in the history of physics the concept of antiparticle and universe or antiproton etcetera are equally true within the existence of previous one. But it is inimical to observe that the in extension researches the phenomenon of discontinuance rejection or reinvention are not focused duly rather they have been set aside especially, rejection and discontinuance as negative behaviour of laggards in social sciences all behavioural elements are in totally and as consequence to technology socialization process can just be seen as output from a unique form of social chemistry so, estimation of adoption or rejection in as isolated manner cannot justify the function of social chemistry rather these are all behavioural diodes. The progress of civilization presents a profile of histories of rejection all the denials by Aristotle, Copernicus, or Galileo to the religious dogmatism have not only enriched the civilization but also set the humanity from blunder and destruction.

Table 2: Stepwise regression analysis of perception on discontinuance (y1) versus 32 independent variables of pooled villages: predominating variables retained at the last step (N=150)

Predictors	B	SE	Beta	t	R	R ²	R square adjusted	SE estimated
Marketing orientation (x26)	0.587	0.089	0.447	6.864**	0.688	0.474	0.456	1.131
Adoption leadership (x17)	0.343	0.097	0.242	3.536**				
Family education status (x3)	-0.091	0.026	-0.218	-3.467**				
Utilization of cosmopolite source of information (x28)	0.986	0.398	0.169	2.477**				
Economic motivation (x22)	-0.212	0.105	-0.127	-2.011*				

Revelation

Table- 2 presents the stepwise regression analysis of perception on discontinuance (y1) versus 32 independent variables of pooled village. It has been found that the predominating predictors viz., market orientation (x26), adoption leadership (x17), family education status (x3), utilization of cosmopolite source of information (x28) and economic motivation (x22) have been retained at the last step of screening. the r² being 0.474, it is to infer that all the above five predominating predictors have explained 47.4 per cent variance embedded with the predicted variable perception on discontinuance (y1).

Implication

Discontinuance is an integral component of technology socialization process which is a

social phenomenon because technologies are socially transmitted and socially maintained. and the causal variables which has been found generating critical impact on the phenomenon of discontinuance both in West Bengal and Bihar, are Market orientation (x26), Adoption leadership (x17), Family education status (x3), Utilization of cosmopolite source of information (x28), and Economic motivation logical culmination of a technology suffering from a liabilities of conventionally or may be a compulsion due to situational development but orientation towards market, cosmopolite source of information, Economic motivation and Adoption leadership are the psychological and management orientation of the farmers as whole are characterizing the process of discontinuance.

Table 3: Path analysis perception on discontinuance (y1) versus 32 exogenous variables of pooled villages

Variables	TE	TDE	TIE	Substantial indirect effect		
				I	II	III
Age (x1)	-0.138	0.088	-0.226	0.095(x10)	-0.089(x3)	0.033(x5)
Education (x2)	-0.366**	0.020	-0.386	-0.136(x3)	-0.127(x26)	-0.119(x10)
Family education status (x3)	-0.248**	-0.257	0.009	-0.106(x10)	0.048(x4)	-0.043(x26)
Educational aspiration (x4)	-0.252**	0.056	-0.308	-0.218(x3)	-0.111(x10)	-0.053(x26)
Family size (x5)	-0.115	0.127	-0.242	-0.106(x10)	-0.062(x3)	-0.050(x26)
Male : Female (x6)	-0.040	-0.005	-0.035	-0.019(x10)	-0.017(x26)	-0.012(x5)
Urbanization index (x7)	-0.110	0.098	-0.208	-0.048(x26)	-0.042(x10)	-0.037(x17)
Occupation (x8)	-0.045	0.084	-0.129	-0.036(x29)	-0.027(x26)	-0.024(x23)
Cropping intensity (x9)	0.225**	0.065	0.160	0.072(x10)	0.065(x26)	0.051(x3)
Farm size (x10)	-0.398**	-0.249	-0.149	-0.122(x26)	-0.109(x3)	0.054(x5)
Expenditure allotment (x11)	0.235**	0.113	0.122	0.043(x17)	0.036(x28)	0.031(x29)
Credit load (x12)	0.009	0.085	-0.076	-0.040(x10)	-0.022(x5)	-0.019(x22)
Annual income (x13)	0.091	-0.050	0.141	0.056(x11)	-0.045(x10)	-0.044(x17)
Electricity consumption (x14)	0.172*	0.067	0.105	0.056(x26)	-0.049(x5)	0.042(x10)
Fuel consumption (x15)	0.093	0.060	0.033	-0.060(x10)	0.044(x11)	-0.034(x3)
Irrigation index (x16)	0.104	-0.028	0.132	0.051(x10)	0.027(x3)	0.024(x26)
Adoption leadership (x17)	0.393**	0.202	0.191	0.076(x26)	0.067(x29)	0.050(x28)
Scientific orientation (x18)	0.040	-0.054	0.094	0.064(x29)	0.046(x17)	-0.038(x3)
Independency (x19)	0.116	0.024	0.092	0.056(x26)	-0.042(x22)	0.025(x17)
Innovation proneness (x20)	0.240**	0.015	0.225	0.105(x26)	0.058(x17)	-0.048(x22)
Risk orientation (x21)	0.226**	0.001	0.225	0.088(x26)	0.039(x17)	0.033(x29)
Economic motivation (x22)	-0.069	-0.179	0.110	0.047(x17)	0.024(x29)	-0.019(x26)
Orientation towards competition (x23)	0.203*	0.066	0.137	0.058(x26)	0.041(x17)	-0.031(x8)
Management orientation (x24)	0.208*	0.043	0.165	0.079(x26)	0.036(x17)	-0.022(x3)
Production orientation (x25)	0.068	0.063	0.005	0.035(x10)	-0.032(x3)	-0.023(x22)
Market orientation (x26)	0.589**	0.293	0.296	0.104(x10)	0.052(x17)	0.043(x29)
Social participation (x27)	0.026	0.010	0.016	-0.073(x10)	-0.072(x3)	0.032(x17)
Utilization of cosmopolite source of information (x28)	0.309**	0.127	0.182	0.085(x29)	0.079(x17)	0.067(x26)
Information seeking behavior (x29)	0.347**	0.157	0.190	0.086(x17)	0.080(x26)	0.069(x28)
Training received (x30)	0.007	-0.099	0.106	-0.035(x3)	0.034(x28)	0.032(x26)
Distance matrix (x31)	0.317**	0.049	0.268	0.102(x26)	0.079(x10)	0.061(x3)
Drudgeries (x32)	0.054	0.023	0.031	-0.031(x10)	0.016(x29)	-0.012(x8)
Residual Effect	0.665					
Highest count	Marketing Orientation (x26):24					

Revelation

Table 3 presents the path analysis of perception on discontinuance (y1) versus 32 exogenous variables of pooled village. It has been found that exogenous variables market orientation (x26) has exerted highest total direct effect whereas the other exogenous variables education (x2) has exerted highest total indirect effect. Table also reveals that the exogenous variables market orientation (x26) has routed the highest substantial indirect effect as many as 24 times to define its tremendous impact on other exogenous variables to ultimately characterize the performance of consequent variable, Perception on discontinuance (y1).

Implication

Market orientation discussed in the earlier tables regardless to West Bengal and Bihar has met

the farmers enough logical towards welcoming alternatives or disillusioned over the non- functioning of prescribed technology. So, education having highest indirect effect has proved that a social and psychological companionship of the variable education in characterizing the performing behaviour of other variable are well discernible for pooled respondents.

Model of social entropy

Model of social entropy (Fig.1) was developed arranging all the R² values of all the dependent variables. Model of social entropy shows that, the dependent variable perception on discontinuance has contributed in second order of strength *i.e.* just after reasons for dissonance. Social entropy itself contributed with the R² value 0.352 which explains its medieval nature among all the dependent variables.

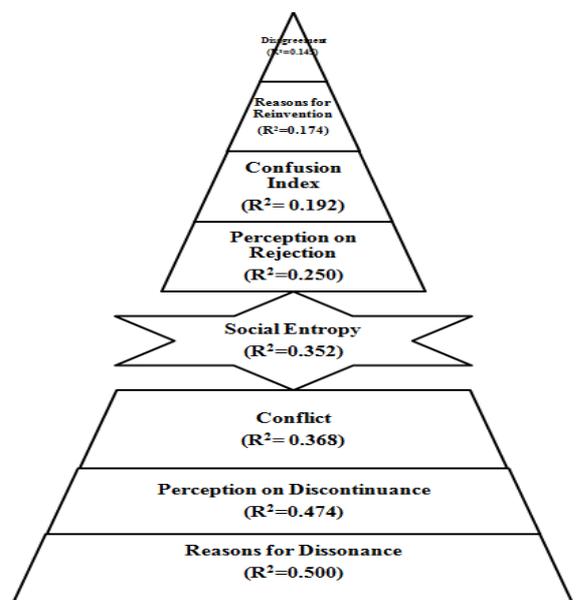


Fig. 1: Model of social entropy

Socio-personal variables viz., education, family education status, educational aspiration and farm size, socio-psychological variables viz. adoption leadership, innovation proneness, risk orientation, and orientation towards competition and agro-economic variables viz., farm size, cropping intensity, expenditure allotment, and electricity consumption were found to significantly associated with the Perception on discontinuance of the respondents of both the village Ghoragachhca and Chiroura when pooled together. Market orientation, adoption leadership, family education status, utilization of cosmopolite source of information and economic motivation were the main causal variable for perception on discontinuance. Market orientation has exerted the highest direct effect and Education has exerted the highest indirect effect on perception on discontinuance. Further market orientation has routed through 24 other independent variable to ultimately characterize the Perception on discontinuance.

REFERENCES

- Acharya, S. K., Pradhan, K. and Adhikary, M. M. 2008. *Socialization of Technology in Agriculture*. Agrotech Publishing Academy, Udaypur, pp. 26.
- Alexander, C., Fernandez, J.C. and Goodhue, R.E. 2002. Determinants of genetically modified organism (GMO) use: A survey of Iowa Corn-soybean Farmers' Acreage Allocation. *In. Market Development for genetically Modified Foods* (Eds. Santaniello, V., Evenson, R. E. and Zilberman, D.), Trossbridge, UK: CABI Publishing.
- Bailey, K. 1994. *System Science and Cybernetics-Entropy System Theory*, Unesco Eloss.
- Bonanno, A. 1989. Appropriate technology, basic needs and development where are the social scientist? *In. Sociology of Agriculture: Technology, Labour, Development and Social Classes in an International Perspective*. Concept Publishing Company, New Delhi, pp. 78.
- Darr David, A. and Chern, W. S. 2002. Analysis of genetically modified organism adoption by Ohio grain Farmers. *Proc. 6th Int. Conf. Agril. Biotech.: new avenues for production, consumption and technology transfer*. Revello Italy, July 11-14, 2002.
- Grown, C. and Bates, T. 1991. Commercial Bank lending practices and the development of Black-owned construction companies. CES 91-9.
- Kwon, T.H. and Zmud, R.W. 1987. Unifying the fragmented models of information systems implementation. *In. Critical Issues in Information System Research* (Eds. Borland, R. J. and Hirshchiem, R. R.), pp. 252-57.
- Parthasarthy, M. 1995. The Impact of discontinuance of the subsequent adoption of an innovation: Theoretical foundations and empirical analysis. *Unpublished Doctoral Dissertation*. University East Lansing.
- Rogers, E.M. 2003. *Diffusion of Innovations*, 5th Edn. Free Press. New York.